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1985 CDSS ANNEX: EGYPT

WATER AND WASTEWATER SECTOR: STATUS, CONSTRAINTS AND STRATEGY

NOTE: Appendices B through I can be found in the
attachments to the Water/Wastewater Sector
Assessment.

ANNEX F WATER/WASTEWATER SECTOR: STATUS, CONSTRAINTS AND STRATEGY

TABLE OF CONTENTS

	<u>Page</u>
LIST OF ABBREVIATIONS	i
I EXECUTIVE SUMMARY	1
A. Background	1
B. Sector Constraints	2
C. Sector Strategy	3
II BACKGROUND AND CURRENT SITUATION	7
A. Introduction	7
B. Population and Urbanization	7
C. Present Service Levels	8
D. Public Health	9
E. Sector Organizations	10
F. Sector Financing by USAID and GOE	11
III SECTOR CONSTRAINTS AND PROPOSALS	12
A. Investment Plans 1983-1987	12
B. Revenue Generation	13
C. Organizational Constraints and Proposals	16
D. Project Planning, Design and Implementation	22
E. Operation and Maintenance	23
F. Manpower and Training	25
IV USAID STRATEGY	27
A. Lessons Learned	27
B. Sector Strategy	28
V APPENDICES	
A. Summary of IBRD's Water Supply and Waste Disposal Program in Tunisia	A-1
B. Urban Growth Projections and Water/Wastewater Service Needs	B-1
C. Environmental Health in Egypt	C-1
D. Sector Organizations	D-1
E. Public Sector Laws	E-1
F. Sector Investment Plans	F-1
G. Operation and Maintenance and Revenue Generation	G-1
H. Report of the People's Assembly, Third Legislative Session	H-1
I. Memorandum to the Higher Committee for Policies and Financial Affairs Regarding Water Rates	I-1

LIST OF ABBREVIATIONS

AID	-	The Agency for International Development of which USAID/Cairo is one overseas mission.
A/GOSD	-	Alexandria General Organization for Sanitary Drainage
AWGA	-	Alexandria Water General Authority
Bab	-	A chapter or section of the GCE budget: Bab 1 = salaries and wages; Bab 2 = other current operating expenses; Bab 3 = capital investment
BVI-P&K	-	Black and Veatch International in association with A.T. Kearny, Consultants
CAOA	-	Central Agency for Organization and Administration
C/GOSD	-	Cairo General Organization for Sanitary Drainage
DRPS	-	USAID Division of Development Resources and Program Support
GDP	-	Gross Domestic Product
GCE	-	Government of Egypt
GOGOS	-	General Organization for Greater Cairo Water Supply
GOSSD	-	General Organization for Sewerage and Sanitary Drainage
IBRD	-	International Bank for Reconstruction and Development (World Bank)
l/c/d	-	Liters per capita per day
LDC	-	Less Developed Country
M ³	-	Cubic meter
NOPWSD	-	National Organization for Potable Water and Sanitary Drainage
PAAD	-	Program Assistance Authorization Document
SCA	-	Suez Canal Authority
UAD	-	Urban Administration and Development
USAID/Cairo	-	The United States Agency for International Development in Cairo, A.R.E.

CHAPTER I

EXECUTIVE SUMMARY

A. Background

1.01 Water and wastewater services in Egypt's major urban complexes are woefully inadequate. After years of neglect, failures in the systems are constantly being experienced and are becoming more serious with each passing year. Most of the present systems were designed to handle water demands and wastewater loads of less than one-half of that which they now face. Water shortages exist in many areas. Rapidly urbanizing areas, particularly in the growing peripheries of Cairo and Alexandria, develop far ahead of the ability of service facilities to catch up. Poor pressure and high leakage in the existing system result in a very low quality of service and growing consumer dissatisfaction. Moreover, on the wastewater side, the issues are even more pressing and acute. In spite of the general inadequacy of water supply, wastewater systems are incapable of handling current flows. As many as 500 documented flooding incidents occur each day in Cairo alone that pose severe health risks and major inconveniences to local populations.

1.02 The present water and wastewater system deficiencies will only grow worse unless a concerted effort is mounted to resolve the problems. Cairo, Alexandria and, to a somewhat lesser degree, the Canal Cities, will experience major population increases over the coming decades as the country as a whole becomes predominantly urban. Increasing numbers of persons will require and demand water and wastewater services from systems that already are seriously inadequate.

1.03 Over the past five years, USAID has obligated \$146.8 million for the water sub-sector and \$242 million for the wastewater sub-sector, of which slightly more than 25% has been expended to date. Greater Cairo received about half of the total obligated funds and Alexandria and the Canal Cities each received one quarter.

1.04 From 1977 to the end of FY 1982, the GOE invested LE 505 million in the water sub-sector and LE 457 million in the wastewater sub-sector. And by the beginning of FY 1983, it was budgeting LE 77 million for operations and maintenance in the water and wastewater sector.

1.05 The 1983-1987 Five Year Plan, only recently approved, calls for a 250% spending increase over the 1977-82 investment program, or a total investment of LE 3.4 billion including existing foreign credits. This represents a substantial shift in investment priorities. The greatest percentage of total investments, over 60%, will go to Cairo, Alexandria, and the three Canal Cities, excluding the Suez Canal Authority investments in the water sub-sector. Of this amount, the largest investments will go to the wastewater sub-sector, with Cairo receiving LE 1.1 billion; Alexandria, LE 300 million; and the Canal Cities, LE 101

million. Foreign assistance over the 1983-87 period will be in addition to the GOE commitments. AID seeks authorization of an additional \$1 billion, and it is anticipated that other donors will contribute the equivalent of approximately \$180 million over the same time period.

B. Sector Constraints

1.06 The planned GOE investments in the sector, as well as the anticipated substantial increase in foreign donor assistance, raises many questions. Not only will the Egyptian construction sector be further stretched beyond capacity but also local material production will not be able to meet the sudden surge in demand for pipe, fittings and related materials, and equipment. Foreign construction contractors and material suppliers will have to provide much of the new material and meet construction demands with respect to system improvements and enlargements. The foreign exchange demand in the sector consequently will increase.

1.07 In addition to these material and construction capacity constraints, there are a number of other more far-reaching problems that will not lend themselves to easy resolution. The present system suffers from a series of institutional, financial and operational constraints and obstacles.

1.08 Institutionally the sector lacks direction. There is no overall set of coherent goals and aims. Water and wastewater organizations and authorities are poorly coordinated. Chairmen of authorities and their Boards of Directors have little fiscal control over their organizations. They cannot set water or wastewater surcharge tariff rates and are completely dependent upon government authorities for their operating and investment budgets. They have insufficient internal management authority to reorganize their operation as may be appropriate, and they do not have full control over employee wages and bonus incentive schemes. Moreover, what authority does exist, often rests with the Chairman alone. However, this problem is not unique to water and wastewater organizations. Little delegation of authority is given to line and staff personnel in other public sector organizations as well.

1.09 Financially the sector is beset by numerous difficulties. To date, GOE spending has been far below system needs, particularly in the area of operation and maintenance. Consistent with the operation and maintenance needs in the sector necessitated by the five-year investment plan, a fourfold increase over present levels of operation and maintenance expenses would be needed. Without substantial improvements in the capacity of sector organizations to generate revenue, the entire system will become more and more dependent upon government subsidies, while the central capacity to provide for such subsidies is doubtful. Revenue generation in the sector will depend in large part upon the amount and rate at which water is sold. And wastewater services largely will depend on a surcharge, which can be added on water tariffs.

Currently the water/wastewater tariff schedules fall far short of paying for the operation and maintenance of the water sub-sector. Wastewater tariffs are non-existent.

1.10 Operationally the sector is performing inadequately. Water flows are insufficient, and constant wastewater flooding exists in many areas. The reasons for the sub-standard level of performance are many, including underfunding of the system, lack of maintenance, as well as inadequate staff and craftsmen support. The sector is unable to attract and retain a sufficient level of professional staff and craftsmen. Severe shortages of experienced and competent personnel, particularly skilled and semi-skilled workers in the wastewater sub-sector, severely limit the ability of the system to respond to daily problems and to provide the level of maintenance needed. Inadequate personnel policies, including low wages and benefits, lack of bonus and promotion schemes tied to merit, and/or additional skill attainment through training severely limit the number and quality of craftsmen and key staff in the sector.

C. USAID Sector Strategy

1.11 Our strategy recognizes that the sector is beset with numerous organizational, financial, and operational constraints. Moreover, it realizes that there are strong and often conflicting forces within the government that, on the one hand, wish to improve the delivery of the system, yet on the other hand wish improvements to be accomplished without substantially increasing the cost of service to consumers. Inherent in this approach is the belief that without major material improvements to the existing systems, additional charges would be politically destabilizing. Nevertheless, there are signs that this attitude is changing. At present, the GOE has major tariff rate increases under consideration. On April 3, 1983, the Cairo Executive, headed by the Governor, approved raising water rates to conserve water use based upon recommendations by the Higher Committee for Policies and Financial Affairs. The Cairo Popular Council now must approve the tariff increases. (See Appendix I "Memorandum to the High Committee for Policies and Financial Affairs Regarding Water Rates," for additional background information".)

1.12 AID/W has raised many of the same sector questions concerning institutional, financial and operational constraints, as outlined above. In particular, AID/W has outlined concerns dealing with: inadequate investment levels, low tariffs and poor cost recovery, fragmentation of responsibility for operations, shortage of skilled staffs, poor maintenance and operation of existing facilities, and excessive water losses. Nevertheless, the Agency also has recognized that "... while several of these problems require immediate attention ... none of the specific problems can be resolved on a longer term basis without first getting a firm GOE commitment to strengthen sector institutions to enable them to manage the sector effectively and efficiently."

1.13 Moreover, the Agency has stressed that the new emphasis on the sector expressed by President Mubarak and other GOE officials "... offers a unique opportunity for an expanded A.I.D. role and serious dialogue with the GOE on numerous sector problems."

1.14 Consequently, USAID's Sector Strategy seeks on the one hand to address the sector constraints and Agency concerns, and on the other hand to find targets of opportunity to build upon new GOE initiatives in the sector. AID's strategy is specifically targeted to inputs in investments, institutional support and technical assistance. We recognize that problems that beset the water and wastewater sector are not unique to Egypt but are common in less developed countries. Experience in other LDC's indicate that solutions are long-term and involve a high level of commitment and political will on the part of the host country. Moreover, nor are they immediate. The World Bank's experience with the water supply and wastewater extends since 1969. And although many institutional and tariff rate changes were accomplished over this period, some areas have remained constant. The "lifeline" tariff rate for small consumers of domestic potable water has been maintained unchanged since 1968 (see Appendix A, Summary of IBRD's Water Supply and Waste Disposal Program in Tunisia).

1. Investment Strategy

1.15 Our sector program will concentrate on further support for Cairo, Alexandria and the Canal Cities, where we already have funded master plans for water and wastewater system development and are funding capital projects in these areas. Our efforts will concentrate on investments that will provide improvements in service to consumers, particularly in the wastewater sub-sector. The investment strategy seeks to meet projected requirements for the year 2000. It will reduce the incidence of wastewater flooding in areas already overloaded or badly deteriorated and will extend wastewater collection systems into unsewered areas that presently are experiencing flooding problems.

1.16 Capital investments first will be phased and prioritized to produce relief to flooded areas. Priority will be given to construction projects for which land or easement have been acquired and on which construction can start and be completed quickly. All means of reducing the length of the project design-build cycle will be jointly examined with the GOE, including the use of turnkey (design-build) and construction management contracting. We will not concentrate our investments in new primary or secondary treatment plants. Rather, investments will focus on improvements and extensions of collection networks. The need for wastewater treatment plants is recognized but is of lower priority than installing necessary collector systems that will take raw sewage off the streets. We also will seek to avoid investment in water systems that would further exacerbate wastewater problems. Water system investments would concentrate on training, management

assistance and commodity support to operations and maintenance to help reduce water wastage and leakage, which contribute to flooding.

1.17 AID will attempt to structure its sector investment program to allow maximum flexibility to shift funds among various sector activities through the use of a sector Program Assistance Authorization Document (PAAD) or other approach acceptable to the GOE. All existing AID water and wastewater projects will be merged within three program activity funds identified by project wherever possible: (1) project design and supervision, (2) project implementation and commodity support, and (3) management and technical assistance.

1.18 Initially the money in each fund will be based upon current USAID obligations and sub-obligations. New money will be obligated to each of these funds based on the total authorization levels in the sector and on the anticipated level of sub-obligation required by each fund over a 12-month period. The proposed \$1 billion for new obligations in the sector sought by AID for the 1983-87 period will not be sufficient to complete all proposed projects. An additional \$408 million will be needed for a total level of future obligations as follows: \$587.7 million for Alexandria Wastewater, \$670 million Cairo Wastewater, \$11.5 million for Cairo water and \$50 million for the Canal Cities. In addition, \$80 million must be obligated for operation/maintenance commodity support and general technical assistance.

2. Institutional Support and Technical Assistance Strategy

1.19 From an institutional and organizational perspective, USAID seeks to support the necessary changes and modifications that may be necessary to bring a higher level of efficiency to system operations. These changes must include a greatly strengthened ability of water and wastewater organizations to obtain increased revenues through tariff rates for support of the operation, maintenance and debt service in the system.

1.20 Our strategy over the next five-year period seeks to develop water tariff increases by 1987 to cover operation, maintenance, debt service and routine annual improvements. It also seeks by 1987 to reduce the volume of unsold water production to 20%. A wastewater surcharge would be added gradually to the water tariffs. Our aim is that the surcharge should be sufficient to cover 25% to 50% of operation, maintenance and routine annual improvement costs of the wastewater system by 1987 and to cover 50% to 75% by 1992.

1.21 In order to meet these targets, several institutional, organizational and operational changes are needed. The various sector organizations need direction to improve their capacity to generate revenue through user charges and to retain the revenues they collect. Because of centralized funding of operation and maintenance expenses from the Ministry of Finance, the sector organizations have little financial

incentive to undertake the difficult and unpopular steps of raising added revenues through higher user charges and in collecting the tariff charges. USAID will support technical/management assistance to the sector organizations to help them improve their management, operation and maintenance functions, including water meter installation, reading, billing and servicing.

1.22 USAID recognizes that there is a need to develop local autonomous organizations responsible for investments and operation and maintenance activities in the sector; and that there is also the need to develop at the national level a policy-setting body to give the sector overall direction and guidance and to provide technical and training assistance. We seek to support these institutional and organizational needs by technical/management assistance to strengthen the National Organization for Potable Water and Sanitary Drainage (NOPWASD). A strengthened NOPWASD would be charged to establish sector policies at the national level, to coordinate sector funding, to provide engineering support to governorate level sector organizations, and to provide comprehensive manpower planning and training services in the sector on a regional level.

1.23 In addition, through the proposed Joint Sector Steering Group and Executive Committee, the GOE and USAID will examine the feasibility of developing local autonomous integrated public water companies for Cairo and Alexandria. The Steering Group and Executive Committee also will examine reorganizing the existing wastewater authorities to provide greater local autonomy and decision making. Further technical assistance would be given NOPWASD to explore ways of improving the solid waste collection efforts in Cairo, Alexandria and in the Canal Cities. These investigations would seek ways of preventing sewer blockage, improving solid waste management systems, and integrating new collection technologies with traditional approaches.

1.24 Furthermore, given the manpower and skills needed in the sector, USAID will support a NOPWASD examination of the overall training needs in the sector. This examination would identify professional and technical needs by organization and by geographic area, and develop a strategy for meeting the training needs. It also would indicate the financial resources necessary and develop a phased program to provide training.

1.25 Finally, USAID has learned over the past five-year involvement it has had in the sector, that covenants to loan agreements, particularly regarding tariff rate changes, tend to be neglected. In this regard the World Bank experience in Tunisia is illuminating. The Bank found that the greater the degree of agreement on underlying policy objectives, the less the need for written covenants. Consequently, our strategy to disbursement of funds will be based on reform actions. We plan to work with the GOE to develop realistic performance targets and a schedule of reform actions that will take into consideration the present constraints in the sector and the greater tariff increases necessary between 1983 and 1987 to support the operation and maintenance of the system.

PART II BACKGROUND AND CURRENT SITUATION

A. Introduction

2.01 The Government of Egypt (GOE) has requested that the Government of the United States substantially increase its support to the water and wastewater sector during the period FY 1983-FY1987. USAID has agreed to seek authorization to allocate \$1 billion to the sector over a five-year time period drawn from the current level of overall U.S. economic assistance of \$1 billion per year. Based upon our past and continuing effort in the sector and the likelihood of major increases in investments in Cairo, Alexandria and the Canal Cities, USAID decided to conduct an assessment of the sector designed to provide a baseline for future annual sector reviews. A six-person, multi-disciplinary team of Egyptian consultants and A.I.D. staff was assembled in January 1983.

2.02 The objectives of the assessment were:

- identify the current problems in the provision of water and wastewater services in Greater Cairo, Alexandria and the three Suez Canal Cities of Ismailia, Port Said and Suez;
- determine the constraints that have caused the current problems;
- recommend measures to alleviate these constraints; and
- propose a USAID Sector Development Program that would support the GOE's efforts to improve water and wastewater services in the target cities.

2.03 Data was collected from consultant reports, relevant GOE laws and regulations, national and sector budgets, and from the newspapers. Lengthy interviews also were held with chairmen and staff of relevant water/wastewater authorities, consultants, ministerial personnel, and various political leaders concerned with water/wastewater issues.

2.04 The draft findings and recommendations of the Assessment were reviewed by the Mission in early March 1983. Our CDSS Annex on Water/Wastewater is based in large part on the draft assessment study and our Mission critique and revisions to the work.

B. Population and Urbanization

2.05 Egypt contained 42 million persons as of April 1980. By the year 2000 it is expected to reach at least 68 million, of which the largest percentage increase will be in urban areas over 10,000 population. In 1907, the country's urban population was only 19 percent. By 1947 it rose to 33 percent urban, and by 1976 it stood at 44 percent. As of April 1980, it was approximately 50 percent urban and by the year 2000 it

is projected to reach 55 percent urban.

2.06 These projections indicate the need for substantial and continuing investments in urban water and wastewater services over the next 20 year period. The National Urban Policy Study (NUPS), has concluded that the major metropolitan regions of Cairo and Alexandria will and should play a major role in accommodating Egypt's urban population increase over the next few decades. The Cairo Region will absorb the greatest share of the expected urban population (43 percent) in the year 2000. It will reach a population of approximately 16 to 16.5 million inhabitants. The Alexandria Zone has the highest potential to compete with the Cairo area for urban migrants. The Alexandria Sewerage Master Plan projection and the NUPS have indicated a projected year 2000 population for Alexandria of between 5 and 5.5 million inhabitants.

2.07 Although the Canal cities have benefitted from reconstruction efforts since the end of hostilities, they have fallen far short of their growth objectives, with the possible exception of Suez. Over time, the locational advantages of these cities with respect to the Suez Canal and to the Delta will ensure their future urban growth. Each of the cities differ in terms of its development potential. The NUPS projections to the year 2000 indicate a population in Suez of between 750,000 and 850,000 or a 5.8% to 6.4% growth rate per year. Ismailia is projected to have a population between 400,000 and 500,000 or a 3.1% to 4.1% growth rate per year. And Port Said is estimated to have a population of between 550,000-650,000 persons or a 3.1%-3.85% growth rate per year. (See Appendix B, for more detailed urban population projections and water, wastewater service needs.)

C. Present Service Levels

2.08 Intermittent water supply, poor pressure, and frequent sewage flooding incidents are common occurrences in many sections of Cairo and Alexandria whose water and wastewater systems were not designed to handle the very heavy present loads on the system. Nor has the system maintenance kept up with needs. Rapid urban population growth, especially in Cairo and Alexandria, has lead to water shortages coupled with inadequate wastewater disposal in densely populated city centers, and little or no access to these services in peripheral urban areas. Many industries have developed their own sources of water supply and wastewater disposal, which in some cases are detrimental to the general environment.

2.09 The water production capacity in Cairo, Alexandria and the Canal Cities is nominally sufficient to provide an average of 275 liters per capita per day (l/c/d) for all purposes. Of this, about 18% is unaccounted for due to leakage, so that about 226 l/c/d is available for use. Approximately another 22% of total water production is wasted due to faulty plumbing and broken standpipes. Thus actual water use may be as low as 110 l/c/d in some areas. Furthermore, these averages conceal a wide variation in the water supply characteristics of these cities.

Cairo is the best served while the Canal Cities, particularly Port Said and Suez, are the least well served.

2.10 Despite the general inadequacy of the water supply systems in Egypt's major cities, their wastewater disposal systems are completely incapable of handle even the current wastewater flows. In Greater Cairo alone there are as many as 500 wastewater flooding incidents every day. Similar situations prevail in Alexandria and the Canal Cities. Wastewater systems are generally confined to the central areas of these cities. Their peripheries rely an individual sewage holding tanks which must be cleaned out periodically at their owners expense.

2.11 Existing wastewater systems are dangerously overloaded and in a poor state of repair. The recent failure of a major wastewater forcemain in Giza provided a graphic example of the kind of disaster that could occur at any moment in Egypt's major cities. Such disasters could have serious public health consequences, but even the current operation and maintenance of these systems contributes to an unsanitary urban environment of serious proportions.

D. Public Health

2.12 Water-related diseases such as infectious hepatitis, typhoid and para-typhoid, as well as dysentery, are increasing throughout Egypt. And although the cause and effect relationship between inadequate water supply and wastewater treatment facilities and public health problems cannot be rigorously demonstrated on the basis of increasing evidence of diseases reported, water-borne human wastes are clearly implicated in the transmission of these diseases. The general inadequacy of water supply and wastewater services, especially in the summer, and in districts with poor housing conditions, may be expected to result in a high incidence of such water-borne and water-related diseases.

2.13 The character of the Nile water, the main source of drinking water in Cairo, Alexandria and the Canal Cities, has been influenced by the completion of the Aswan High Dam. Analysis from five river cross-sections: Aswan, Asyuit, Cairo, the Damietta branch and the Rosetta branch, indicate that plankton types and distributions are changing periodically, turbidity is increasing, coli counts are higher and more diversified, and the occurrence of oil slicks on the river is more frequent due to increased navigation. These changes in the quality of the Nile water have important implications regarding cost of potable water treatment.

2.14 Existing wastewater collection systems in Cairo, Alexandria and the Canal Cities are overloaded. Extensive portions of the system are operated in surcharged conditions, even during dry weather, and are discharging directly either to river, sea or to nearby surface drains. Large quantities of garbage, trash, toxic industrial wastes and other materials are illegally dumped into the system. This results in a

reduction of flow capacity, the ultimate blockage of sewers. (See Appendix C, Environmental Health in Egypt for more details).

E. Sector Organizations

2.15 A variety of GOE organizations administer the water and wastewater sector. At the national level the Minister of Development has the responsibility for coordinating the development and operation of the sector through the National Organization of Potable Water and Sanitary Drainage (NOPWASD) the successor agency to GOSSD and GOFW. The Ministry of Health is involved indirectly through its responsibility for ensuring adherence to pollution control laws and potable water quality standards.

2.16 Day-to-day management of the sector is vested in several types of organizations with varying levels of responsibility. (See Appendix D, Sector Organizations.) With regard to water supply, Cairo and Alexandria have fully integrated water authorities, GOGWS and AWGA, which undertake both system development and operation using independent budgets established by the Ministry of Planning (Bab 3 investment budget) and Ministry of Finance (Bab 1 and 2 wages and operational maintenance budgets). The Chairmen of the authorities are under the administrative control of their respective governors.

2.17 In the three Suez Canal Cities a fully integrated development/operations service is provided by the SCA using a small part of its Bab 1, 2, and 3 budgets established by the Ministries of Planning and Finance. The SCA water service is not controlled by the three governors or the Minister of Development.

2.18 In all other areas, both urban and rural, NOPWASD is responsible for developing the water system using its own Bab-3 budget while the Governorates operate and maintain the systems out of Bab 1 and 2 budgets. In the Governorates of Behera and Karf El Sheikh, public sector water companies are being organized that eventually will provide fully integrated service financed by user charges. However, they have yet to reach that stage of development and currently operate on the NOPWASD-Governorate organizational model.

2.19 In the wastewater subsector, Cairo and Alexandria also have individual wastewater authorities, C/GOSD and A/GOSD. A/GOSD operates a fully integrated service combining development and operation, using its own budgets under the administrative control of the Governor of Alexandria. C/GOSD operates in a similar way except that major, foreign financed system development projects come under the control of CWO which is an administrative arm of the Ministry of Development with its own Bab-3 budget. Operations, maintenance and smaller capital investment projects are managed by C/GOSD. NOPWASD is responsible for development of all other wastewater systems using its own Bab-3 budget allocations. The governorates are responsible for the operation of the systems turned over to them by NOPWASD. Parts of each governorate's Bab 1 and 2 budgets are used for the operation and maintenance of wastewater systems.

2.20 In order to address water and wastewater project implementation issues, USAID and the Ministry of Development have formed a Sector Working Group composed of the AD/DRPS and the Senior Under-Secretaries of the Ministry of Development and Housing. The Sector Working Group is responsible for resolving implementation problems facing projects in the sector and seeking means of improving overall implementation performance.

F. Sector Financing by USAID and GOE

USAID Financing (1977 - 1982):

2.21 Both USAID and the GOE have undertaken major financial commitments to the water and wastewater sector over the past five years. USAID has obligated \$146.8 million for the water subsector and \$242 million for the wastewater subsector. Of these amounts \$105 million was loan, and \$283.8 million was grant monies. However, a significant portion of USAID's commitments have not yet been expended to date due to the long lead-time required to plan, design, and contract for sector projects. Of the total obligations of \$389 million, only approximately \$102 million had been expended by the end of FY 1982. Nevertheless, large portions of the unexpended funds have been subobligated to projects. Greater Cairo received just under half of the total obligated funds for rehabilitation and expansion of the Rod El Farag water plant, and for the rehabilitation, repair, and minor modification of the wastewater system in Cairo. Alexandria received 26% of total obligations for improvement, upgrading, and expansion of its wastewater system. The three Canal cities received 25% of the total for reconstruction and expansion of both their water and wastewater systems.

GOE Financing (1977 - 1982):

2.22 GOE water and wastewater investments under the last Five Year Plan (1977 -1981/82) were included in the public utilities investment total of LE 1016.7 million. Water and wastewater projects constituted about 95% of that total, or LE 962 million. Of this amount, approximately LE 505 million was expended in the water subsector, while LE 457 was expended in the wastewater subsector. Thus water and wastewater investments constituted nearly 6% of total Egyptian investment from 1977 to the end of FY 1982. The sector consumed 7.5% of total public sector investments and required the use of 1.3% of GDP during last Five Year Plan period. By the beginning of FY 1983 the GOE was budgeting LE 77 million for operation and maintenance of water and wastewater systems.

PART III SECTOR CONSTRAINTS AND PROPOSALS

A. Investment Plans 1983-1987

3.01 The 1983-1987, recently approved GOE Five Year Plan calls for a LE 3.4 billion investment in the water and wastewater sector in current LE. This represents a 250% spending increase over the 1977-82 investment program. Whether the GOE will be able to meet its obligations under this plan is yet to be demonstrated. Cairo, Alexandria and the three Canal Cities, excluding the Suez Canal Authority (SCA) water investments for the Canal Cities, will receive approximately LE 2.1 billion of the total planned investment in the sector.

3.02 Water system investments will amount to LE 348 million for Cairo and LE 241 million for Alexandria. Wastewater system investments are planned to reach a level of LE 1.5 billion, with LE 1.1 billion for Cairo, LE 300 million for Alexandria, and LE 101 million for the Canal Cities. These totals are exclusive of new foreign assistance that may be programmed for the sector during the Five Year Plan period.

3.03 In support of this massive investment program, AID has pledged to seek authorization of an additional \$1 billion to be obligated for the water and wastewater sector during the period FY 1983 through FY 1987. In addition, it is anticipated that other donors will contribute the equivalent of up to \$180 million over the same period.

3.04 The planned water and wastewater investment program represents a substantial shift in investment priorities compared to the preceding Five Year Plan. Water and wastewater investments are expected to reach 12% of public sector fixed investments compared to 7.5% for the 1977-1982 period. As a result, the sector will claim 2.7% of total GDP generated by 1987 compared to only 1.3% over the last five years. These increases are very large and they create questions about both the absorptive capacity of the sector and the ability of the economy to sustain such increased levels of investment.

3.05 Based on past performance of the sector, it is doubtful that it can absorb the planned level of investment by operating in the same way as it has in the past. The capacity of the Egyptian construction sector is already stretched very thin and can not be realistically expected to expand to accommodate the extraordinary requirements of the planned water and wastewater program. Similarly, local materials production, though growing, is not in a position to accommodate a sudden surge in demand for pipe, fittings, water meters and other material over the next five years. Thus, it will be necessary to rely more heavily than in the past on foreign construction contractors and materials suppliers, with the result that foreign exchange demand by the sector will increase.

3.06 Notwithstanding all assurances and plans to the contrary, it may be difficult for the GOE to come up with the necessary investment funds without resorting to an increased rate of money supply expansion. This

problem will intensify as new water and wastewater facilities come on stream and will require increasing levels of operations and maintenance expenditures. It is estimated that if the GOE's Five Year Plan for water and wastewater is realized, the new works alone will require an annual operations and maintenance expenditure of LE 272 million by the end of the fifth year (in current 1982-1983 LE). This compares to an operations and maintenance budget of only LE 77 million for all existing system in FY 1982-83.

3.07 Since water tariff revenues will not reach self-sufficiency levels immediately and wastewater tariff revenues can be expected to lag even further, continued budget support for both investment and operations - maintenance will be necessary throughout the five year period. Rationalizing this budget support and combining it with increased tariff revenues must become a high priority for the GOE. (See Appendix F, Sector Investment Plans, for more detailed analysis of GOE five-year investment plan.)

B. Revenue Generation Constraints and Proposals

1. Constraints

3.08 GOE budget support funds for the operation and maintenance of water and wastewater sector operations have not been sufficient in the past. Therefore, it is essential that the various sector organizations improve their capacity to generate revenue, thereby reducing the subsidy burden created by the sector. Revenue generation for the sector must originate, for the most part, in the water subsector as billing for wastewater services in Egypt is deemed feasible only if accomplished through a surcharge on water tariffs. Thus, the level of revenue generated by the sector will depend upon the amount of accounted-for water sold and the water-wastewater tariff schedule.

3.09 The current water tariff schedules applicable in Cairo, Alexandria and the Canal Cities are deficient. Water tariffs (expressed in LE/cubic meter) are substantially below the average operation-maintenance cost of the systems on a per cubic meter of water produced basis. They are even further below their required levels if routine improvements and debt service are included in calculating the cost of water produced. Wastewater tariffs are non-existent at present throughout Egypt. Nevertheless, USAID concurs with the consultant, R. McGarry (see paper "Cairo, Alexandria, and Canal Cities Water and Sewer Program"), that water/wastewater tariffs should not provide a return on investment in fixed assets nor cover depreciation.

3.10 In the case of Cairo, water tariffs have not changed since the GOE took over the French-operated Cairo Water Company in 1956. The average basic cost of potable water produced by GOGCWS is estimated at about LE 0.025/m³. Including a 150% salary bonus increase for workers, debt service and improvements would raise the average total cost to L.E. 0.048 in 1983 and L.E. 0.074 in 1987. The average water tariff

charged by GOGCWS is only LE 0.012/m³ or about 50% of the average basic cost of water sold in 1982. Similar situations prevail in Alexandria and the Canal cities, although Alexandria has raised tariffs for commercial and industrial consumers so that AWGA's average tariff is about LE 0.029/m³ compared to total costs of about LE 0.035/m³ produced. (See Appendix G. Operation and Maintenance and Revenue Generation for more details.)

3.11 Deficient tariffs pose a substantial problem for the sector. In addition, unaccounted-for and unsold water pose another serious problem. As much as 35% of all water produced in Cairo goes unsold. Similar situations exist in Alexandria and in the Canal Cities.

3.12 The major problems in the water subsector arise from:

- leakage due to old or substandard distribution networks,
- under recording of water use due to lack of meter maintenance, with consequential water wastage,
- lack of meter reading due to shortages of meter readers, lack of training, and lack of performance incentives,
- unmetered stand pipe services in many densely populated areas, and
- failure of most government facilities to pay their water bills.

3.13 A major factor contributing to the lack of revenue generation is the fact that water organizations can not retain the revenues they collect. Instead, the revenues are turned over to the Ministry of Finance, which allocates budgets to the organizations with little reference to the revenues they produce, or even to the organizations' own estimates of the funds required to adequately operate and maintain their systems. Thus, sector organizations have limited incentive to undertake the difficult and unpopular steps necessary to increase their revenue generation capacity. Nevertheless, some organizations, e.g. AWGA, have been successful in raising tariffs over the past few years.

2. Proposals

3.14 In order to ease the revenue constraint on the water and wastewater sector, several steps must be taken simultaneously during the coming Five Year period.

- . First, average water tariffs must be increased to a level adequate to ensure that revenues match the operation, maintenance, routine improvement costs, and existing debt service of the water systems by 1987. (See table G-10 for GOGCWS example.). These tariffs must also be collected from all users including the public sector.

- . Second, a major effort should be undertaken to reduce the volume of unsold water production to no more than 20% by 1987.
- . Third, a wastewater surcharge should be added gradually to the water tariffs to help defray the cost of wastewater services. The surcharge revenues should be transferred directly from the water organizations to the wastewater organizations. The surcharge should be introduced gradually so that at least 25% to 50% of the operation, maintenance, and routine improvement costs of the systems are covered by 1987 and by 1992, 50% to 75% coverage of these costs should be attained. Calculations indicate that an additional tariff rate of LE 0.004 is needed to pick up 12% of the O&M for the C/GOSD in 1983 and LE 0.020 in order to cover 50% of O&M in 1987. These figures do not include debt service but do include a 150% salary bonus increase for all workers in the Cairo wastewater organization as recommended by the Sector Assessment Study. It is understood that salary bonus increases may not be met immediately. However, USAID is committed to a positive movement on this issue and will explore the most effective means to achieve this end, including the development of autonomous water and wastewater organizations with the authority to retain revenues.

The Cairo Council recently approved a tariff increase of LE 0.025/m³ for all domestic users of water. Calculations based on the projections of water sales for different groups of water consumers indicate that the water system would run a surplus until FY 1987. However, if improvements in water metering were introduced, the surpluses could be greatly increased and deficits in 1987 reduced or possibly eliminated. (See Appendix G and table 10, for more details.)

- . Fourth, all sector organizations should be empowered to retain their tariff revenues. Budget subsidies for operations, maintenance and depreciation from the Ministry of Finance should be established in advance for the next five years on a declining scale that eliminates water subsidies by 1987 and wastewater subsidies by 1992. However, in neither water nor wastewater systems should revenues contribute to a depreciation reserve since capital improvements should be either loan or grant financed at the time they are required. Moreover, wastewater systems should be financed on a grant basis, similar to a large extent to the substantial grant financing received by wastewater systems in the U.S.

3.15 These steps will not be easy for the GOE, but they are essential if the water and wastewater sector is to attain a semblance of financial viability over the next decade. They will also necessitate changes in both organization and management of sector authorities and agencies. Without financial viability the sector will continue to suffer the kind

of neglect that has lead it perilously close to physical collapse over the past thirty years.

3.16 In order to implement these changes the GOE will have to muster more political will than it has demonstrated in the past. There is strong evidence that the Egyptian people are able and willing to pay for water and wastewater services if the sector organizations can operate them efficiently. For that reason it is essential that sector organizations are developed that can effectively deliver the needed services. Financial viability, institutional development and organizational arrangements are closely linked. (See Appendix I "Memorandum to the Higher Committee for Political and Financial Affairs Regarding Water Rates", from Eng. El Kafrawi. Also, see Appendix G, Operation and Maintenance and Revenue Generation, for an analysis of sector needs.)

C. Organizational Constraints and Proposals

1. Constraints

3.17 The performance of the organizations responsible for water and wastewater activities in Cairo, Alexandria and the Canal Cities (excluding the SCA) is adversely affected by a number of factors including:

- a. lack of adequate financial self-sufficiency; complete financial dependency on central government financing for both investments and operation and maintenance of the systems;
- b. lack of control over budgets (Babs 1, 2, and 3);
- c. low wage scales and low total incentive package for employees at all levels of skills but particularly severe at the skilled craftsman and professional levels;
- d. no overall and coherent set of sector development goals and personnel objectives, including wages, bonuses, training and budgets;
- e. lack of coordination between water development targets and those of wastewater.

3.18 The present water/wastewater organizations are neither completely centralized nor decentralized. Rather, authority and responsibility is dispersed among numerous public entities organized at both national and local levels. Consequently, there are neither well structured central goals and controls nor sufficient local authority and autonomy in capital investment projects and in operation and maintenance of the systems. Furthermore, since water and wastewater are run by separate organizations, difficulties in the investment coordination between these bodies often are encountered.

3.19 In the Greater Cairo Area, responsibilities for wastewater are separated between the organization charged with providing for capital development, CWO, and that organization charged with operations-maintenance services C/GOSD. In addition, both of these organizations, as well as GOGCWS are involved in operations across three governorates. This presents numerous problems, particularly for the Giza Governorate who believe that their interests especially in operation-maintenance of wastewater come second to the interests of the Cairo Governorate. The Canal Cities face a series of overlapping authorities and jurisdictions in the planning, development, operation and maintenance of water and wastewater services. The SCA is responsible for investment and operation-maintenance in water for Suez, Port Said and Ismailia cities. NOFWASD handles water investment in the Ismailia Governorate and wastewater investments throughout the three governorates. The individual governorates are theoretically responsible for operation-maintenance for wastewater but appear to have neither an adequate budget nor staff to effectively deal with this service.

3.20 From an organizational perspective, the Alexandria Governorate has greater control over AWGA and A/GOSD. The chairmen of both of these organizations report directly to the governor and with the exception of AWGA serving a portion of northern Behera and Marsa Matruh, the activities of both organizations are contained within the confines of the Governorate of Alexandria. Moreover, both entities are responsible for investment as well as O&M services. One difficulty is in the area of coordination. There is the danger of water services moving too far out ahead of wastewater service.

2. Proposals

3.21 Several approaches to organization and re-organization in the sector have been advanced and some have been tried over the past few years. Both Cairo and Alexandria were part of a national GOSD and were recently split off in an attempt to provide better planning and management for these large and expanding wastewater systems. Indeed, much earlier, the water systems in Cairo and Alexandria were run as private companies, only to be nationalized during the late 1950s and run as public authorities.

3.22 Understandably, there are many variations and combinations of the present systems which can be proposed to provide better guidance and management. However, attention to two basic concepts is important:

there is a need to develop local autonomous organizations responsible for planning, development, operation and maintenance of water and wastewater services, and,

there is a parallel need for a national level public body to establish sector policies, and provide local level organizations with technical assistance and training support on a contractual fee basis.

a. Local Autonomous Organizations

3.23 Water Companies: The Sector Assessment Study recommends that local autonomous integrated public companies should be developed for the water sector in both Cairo and Alexandria with tariff rates setting ability. USAID agrees with this recommendation. Under the Public Sector Companies Law No. 111 of 1975 (See Appendix E for a complete translation of the law), the Board of Directors, among other functions, is responsible for:

- 1) developing overall plans for the company and taking the necessary measures for increasing production, efficiency and realization of company's goals;
- 2) providing, developing and retaining a sufficient funding base out of the company operation for financing recurrent operations and maintenance costs;
- 3) replacing and renovating company activities within related company reserves and within operational goals and plans of the company;
- 4) laying down the costing-base for each company activity and the related performance standards;
- 5) structuring the management layout and personnel system and determining the employment scheme;
- 6) estimating revenues and expenditures specified by the planned budget and endeavoring to increase revenues and decrease costs;
- 7) designing a training system for company personnel.

The above responsibilities of public sector companies have several advantages over the existing public authority structures. A public sector company structure provides greater internal control over operations and maintenance and ministerial decisions. It also allows for more accountability in setting a revenue policy to cover expenditures, particularly operation and maintenance. Furthermore, public sector companies can retain their earnings to offset operation and maintenance expenses. It should also be noted that public sector companies have greater ability to provide incentive payments to public employees so as to make their remuneration more competitive with alternative employment opportunities.

3.24 The GOGWS, which plans, designs, constructs, operates and maintains water supply in the Greater Cairo Area, should be formed into the Greater Cairo Water Supply Company, with the ability to retain earnings for operation and maintenance and debt service requirements. The new company should be responsible to a board of directors headed by

the Governor of Cairo with members drawn from all three governments served by the company. BVI-ATK Associates made a number of internal reorganizational recommendations. (See BVI-ATK Report, Management and Tariff Studies Relative to Water/Sewerage Systems, Organizational Manual, Final Report, Oct. 1979.) These recommendations should be reviewed in reorganizing the authority under a public company status.

3.25 Alexandria Water General Authority (AWGA), which is responsible for the planning, development, operation, and maintenance of all water activities in the Alexandria governorate, including Mersa Matruh and northern portions of the Behera Governorate, should, as in the case of GOGWS, be reorganized as a public sector company. The company's board of directors should be established by the Governor of Alexandria.

3.26 The Sector Assessment Study also recommends that the Suez Canal Authority (SCA), currently responsible for the planning, development, operation and maintenance of all water activities in the three Canal Cities of Suez, Ismailia and Port Said should be divested of direct responsibility for water services. Water services within the Suez Canal area should be operated through a subsidiary company of the SCA. (The development of water activities outside of Ismailia City, i.e., in the Governorate of Ismailia, is handled by NOFWASD.)

3.27 USAID agrees that the establishment of a Suez Canal Area Water Supply company as a subsidiary company of the SCA has merit and needs to be further explored particularly if it can be accomplished without altering the current organizational structure or employee benefits arrangements. The company board of directors might include representatives from the three canal cities, but chairmanship and control of the company should be vested in the SCA.

3.28 Wastewater Authorities: Cairo Wastewater Organization (CWO) plans, designs, and constructs wastewater projects in the Greater Cairo Area involving all foreign funded activities. This organization has a relatively very small staff of approximately 40 employees of which only a few are professionals. It is recommended that it be brought under the overall structure of C/GOSD at the level of the chairman's office. At present, the Chairman of C/GOSD is also the Chairman of CWO due to the need to closely coordinate these organizations. From planning and operational points of view, there is little reason to divide the two activities under separate organizations. However, CWO needs to operate as a well defined project unit within C/GOSD.

3.29 Cairo General Organization for Sanitary Drainage (C/GOSD) operates and maintains wastewater activities in the Greater Cairo Area. C/GOSD is the major organization dealing with wastewater activities in the Greater Cairo Area. It has a staff of approximately 9,000 employees. It also is involved in a limited way in the development of minor wastewater projects, i.e., connectors, laterals, etc. To a certain extent its projects and operations and maintenance are broken down by

area to include separate operation and maintenance services for Giza. Nevertheless, further restructuring of its operations and maintenance functions on the basis of east bank and west bank divisions is necessary to make them more responsive to the concerns of the Giza Governorate.

3.30 Under the present arrangement, C/GOSD technically reports to and is under the overall guidance of the Cairo governor. However, in practice, given the technical nature of its operations, its investment and operation and maintenance decisions are not politically made on a governorate basis. Nevertheless, some consideration should be given to providing the Giza governorate with a sharing of policy guidance and decision making in investment and operation and maintenance activities. Ideally, this should be accomplished at the top, with all three governors—Cairo, Giza and Qualibiya—sitting on a policy committee, chaired by the Cairo Governor. This committee would establish the broad policies for development, maintenance and operation of the system.

3.31 Alexandria General Organization for Sanitary Drainage (A/GOSD), which is responsible for the planning, development, operation, and maintenance of all wastewater activities in the Alexandria Governorate, should remain as presently organized, i.e., as a general organization responsible to the Governor of Alexandria. Coordination of water and wastewater should be the responsibility of the Governor's Council, headed by the Governor with the Chairman of A/GOSD and the Alexandria Water Supply Company as members.

3.32 In addition, several internal recommendations on responsibilities and staffing were made by the consulting firm of Boyle and Arthur Young. These recommendations should be reviewed, modified and/or adopted. (See Boyle/AQC Implementation Plan and the Twenty-Two Month Program Evaluation Report, February 1983.)

3.33 In the three Suez Canal cities, NOPWASD (which is responsible for planning and development of the wastewater systems) should be divested of these responsibilities as soon as the wastewater subsector can be reorganized in the Suez Canal area. One approach to reorganization would be to form wastewater organizations in each governorate, i.e. I/GOSD in Ismailia, PS/GOSD in Port Said, and S/GOSD in Suez. These new organizations should also be responsible for operation and maintenance of the systems which will be constructed. These organizations should have their own budgets (Babs 1, 2, and 3) outside of their respective Governorate budgets as is the case with A/GOSD and C/GOSD.

3.34 Since it will take time to organize and staff these proposed organizations, their budgeted funds should be used to contract with NOPWASD or SCA for both development and operation-maintenance services until they have developed their own capacity. Another viable option would be for the SCA to initially assume responsibility for development, operation, and maintenance of the wastewater systems within the Works Division which currently manages the water systems. These services could

then become part of an SCA subsidiary company for both water and wastewater services. Either of these options would be preferable to the current arrangement. It is recommended that the USAID - GOE Joint Sector Steering Group undertake an indepth review of these options and propose for implementation the one that is most advantageous.

b. National Policy-making Body

3.35 At the national level, NOPWASD should be strengthened so as to take responsibility for those functions that cannot be efficiently decentralized to local organizations. It should also play the role of the "in-house" advisor to the GOE. NOPWASD should be charged with the following functions:

- assisting the Ministries of Finance and Planning with their respective five-year investment plan for the sector;

- developing sector manpower through liaison with the Central Agency for Organization and Administration, CAOAA;

- developing regional units in Alexandria and the Canal Cities, including training centers to assist local utilities organizations in enhancing technical and managerial skills;

- establishing and enforcing broad sector policies concerning tariff structures, sector objectives and coordination of water and wastewater activities;

- providing technical services such as system planning, engineering design, manpower planning, and system operation and maintenance on a contractual (fee-for-services) basis to those local organizations that do not have adequate staff to perform these services on their own;

- providing sector specific training programs for developing managerial, technical, and skilled workers for the local organization on a fee basis.

Although NOPWASD currently is charged with many of these responsibilities, it has failed to perform them adequately to date. In part, this is due to a lack of qualified staff, but primarily it is a problem of management's having to make a transition from being a system operating organization under GOPW and GOSSD to becoming a policy and services organization under NOPWASD. Greater management effort should be applied to hastening this transition. Management advisory services to NOPWASD are needed to help that organization reorient its staff and its procedures to its new objectives as outlined above.

D. Project Planning, Design and Implementation

3.36 USAID has funded master plans for water and wastewater system development for the cities of Alexandria, Cairo, Ismailia, Port Said, and Suez. Water system improvements also have been designed for these cities. Implementation of these designs is underway in Alexandria (with IBRD funding), and is about to start in Cairo and the three Suez Canal cities.

3.37 Wastewater systems have not progressed as rapidly. Although the "Top priority Projects" are under implementation in Alexandria, the major system improvements have been delayed due to A/GOSD's reluctance to approve master plans calling for ocean disposal of sewage. A/GOSD has also delayed approval of design contract amendments for Phase I and Phase II work. Nevertheless, major portions of the design work are complete and could be tendered starting early in FY 1984.

3.38 In Cairo, one contract for rehabilitation of wastewater pump stations has been awarded and another will be tendered in FY 1983. Conceptual designs are complete for the major wastewater system improvements but detail design has yet to be initiated for the works on the West Bank of the Nile. These designs will not be finished before the second quarter of FY 1984 if they start immediately.

3.39 In the three Canal cities, wastewater system designs are complete and it is expected that implementation can begin before the end of FY 1983.

3.40 Planning and design of water and wastewater projects has been a lengthy process. Under the best of circumstances it is not unusual for this process to take three to four years. In Egypt, however, the process has been delayed by lengthy planning and design reviews, slowness in design contracting and amendment of contracts, and complex procedures for awarding implementation contracts (both for procurement and construction). In the main, this is due to the involvement of both USAID and GOE sector organizations. Both are inadequately staffed to handle the large number of separate interventions they are obliged to undertake.

3.41 In order to reduce the time required to implement the GOE 1983-1987 Water and Wastewater Investment Plan, it is recommended that maximum use be made of turnkey (or design-build) contracting. Under this approach USAID and the GOE would give total implementation responsibility to a single contractor for each major, discrete element of the system. That contractor would complete the design work, procure all material and equipment, and construct the works. USAID and GOE responsibility would be minimized. The work would be contracted on a lump-sum, fixed-time basis once designs had reached the 80% complete stage.

3.42 Implementation delays could be minimized using turnkey contracting, but it would entail both the GOE's and USAID's turning over

major responsibility to the turnkey contractor and the supervisory engineering firm. Implementation could still be delayed if the GOE does not expedite land acquisition, construction permits, customs clearances, and diversion of existing services and traffic. According to the water/wastewater assessment study, these implementation activities should be carefully monitored by a joint USAID-GOE Sector Executive Committee composed of the senior Under Secretaries of the Ministry of Development and the USAID Office Director for UAD. The Joint Sector Executive Committee would be responsible for identifying and resolving implementation problems as well as coordinating the annual Sector Review.

E. Operation and Maintenance of Systems

3.43 Water and wastewater systems have not been adequately maintained in Egypt for the past several decades. With generally inadequate budgets throughout the sector, and rapidly growing urban populations, greater emphasis has been given to the capital investment side (Bab 3) than to operation and maintenance (Bab 1 and Bab 2). This has contributed to serious deterioration of the systems. Maintenance often is deferred until problems become serious enough to require a capital investment project. Despite this approach, water and wastewater personnel have performed technical miracles just to keep their old systems operating. Ingenuity, hard work and long hours have been substituted for needed spare parts, management systems, and sufficient numbers of skilled craftsmen, supervisors and engineers. The problems of operation and maintenance vary from one sector organization to another, but those mentioned below are found to some extent in all organizations.

3.44 In the water subsector, treatment plants are operating at over their designed capacity, thus reducing the margin of safety in the system. Water transmission mains are old and leaky resulting in as much as 18% loss of water during transmission. There is a shortage of operable water meters so that large quantities of water (up to 30% of production in some cities) go unaccounted-for.

3.45 In the wastewater subsector, there are extensive sewage flooding problems due to overloaded systems: undersized laterals and collectors, inadequate lifting and pumping capacity, and insufficient numbers of forcemains. Treatment plants operate in a continuously overloaded condition which adds to flooding problems and causes raw sewage to be discharged from some plants without treatment.

3.46 Although many of these problems now require major capital investments to be overcome, the prior lack of adequate operation and maintenance measures has contributed to their creation. The factors underlying inadequate operation and maintenance also vary between organizations. In general, water organizations have somewhat better operation and maintenance programs than do wastewater organizations.

3.47 The key factor limiting operation and maintenance performance is

the shortage of skilled workers and supervisors. This fact has been highlighted by every study of the sector since the mid-1970's. Underlying the shortage of skilled workers are several causes:

- low salaries based on government pay scales,
- lack of funds to pay adequate incentives and bounsers to bring total compensation into a competitive range with alternative employers,
- hazardous working conditions and lack of prestige within the sector (especially the wastewater subsector),
- inability of sector organizations to retain employees that they have trained at their own expense.

3.48 There are also other factors that make operations and maintenance difficult for water and wastewater organizations. Inventory control over equipment, material and spare parts is seriously deficient. This results in delays in executing repairs and unorganized purchasing activity. Preventative maintenance systems are generally not employed. Instead, organizations spend most of their time responding to emergencies. Workshop and repair facilities are inadequate in both quantity and quality. Maintenance equipment is not properly operated due to lack of operator training and supervision. Because managers fear equipment will be damaged by workers, they sometimes do not send it into the field at all. There is virtually no delegation of authority and responsibility within sector organizations. This decision structure places an unmanageable burden on top level executives who become bogged down in details and are left with no time to deal with broader management problems.

3.49 There are a number of steps that should be undertaken to improve operations and maintenance in the water and wastewater sector. First, compensation for sector workers must be substantially increased. Since base pay levels are regulated by government service salary scales that must apply to all government workers, the incentive component is the necessary avenue to pursue to obtain additional worker compensation. The Sector Assessment Study proposes that incentives payments of no less than 300% of base pay should be provided for all skilled workers. Any additional incentive payments over 300% up to a total of 500% of base pay should be paid to workers in occupations where there is an actue shortage of personnel that is not eased as a result of the general incentive payment.

Although USAID agrees that additional incentives are needed in the sector, three to fivefold increases may be unreasonable to expect within the immediate future. On the other hand, we believe that movement in the compensation package is a necessary ingredient that needs to be taken into consideration in developing our sector obligation levels. Draft

legislation presently is under consideration in the Cabinet and People's Assembly Committee to mandate special incentives for employees in the wastewater subsector. We propose to engage the GOE in a policy dialogue on the compensation issue through the Sector Steering Group and to develop more precise guidelines for sector obligation purposes.

Second, the GOE must commit itself to maintain budget support levels adequate to fully fund the necessary incentives until tariff revenues eliminate this requirement. Incentive payments must not be allowed to decline for lack of funds in the Bab 1 budgets of sector organizations.

Third, sector organizations must undertake intensive recruitment and training programs in connection with the increases in compensation. The number of workers recruited and trained should be in excess of the actual needs of the sector organizations in recognition of the fact that not all trainees will remain in the sector.

Fourth, the workshop, warehousing, and maintenance equipment needs of the sector organizations should be surveyed immediately. Designs for needed facilities and equipment specifications should be prepared within the next six months in anticipation of future funding.

Fifth, each sector organization should retain a management advisory group to undertake a review of operations and maintenance activities as was done in A/GOSD. Based on the review, the consultants together with the concerned GOE organization should prepare a management assistance plan in anticipation of future funding.

F. Manpower and Training

3.50 Although severe shortages of experienced and competent staff exist at all levels in sector organizations, the shortage of semi-skilled and skilled workers in the wastewater sector is particularly acute. Low wage levels, and often hazardous and unhealthy working conditions, severely limit the number of qualified staff in the public wastewater occupational categories. And while the government's full employment policy ensures that public wastewater organizations have a continuous supply of manpower, there is, nevertheless, a continual drain of the better qualified staff (both professional and craftsmen) to better paid jobs in the Gulf area and to other sectors in the economy. Various categories of craftsmen (e.g., plumbers, electricians, and fitters) are in very short supply throughout the sector. The scarcity is particularly acute at the local governmental level where there are often none or only one or two responsible for the maintenance of an entire wastewater system.

3.51 Understandably, the quality, number and efficiency of craftsmen as well as other key staff in the sector could be greatly improved by offering salaries, fringe benefits, and promotion opportunities that would be competitive with those offered by other employers. Law 47 of 1978 sets the civil service pay scales. There have been several recent attempts to amend this law to allow for differences in the various civil

service groupings according to worker demand, health hazards, etc. The Miners Law (27/1981) has succeeded in developing a new base pay scale, an incentive scheme and fringe benefits for workers in the mining sector. Similar proposals have been advanced for the wastewater sector. Recent negotiations underway between the Prime Minister, Chairman of Manpower Committee of the People's Assembly, and the Chairman of the Trade Union Workers Syndicate indicate that a compromise package for those employed in the wastewater sector may be achieved. This would not change the base pay but would increase the mandatory allowances to up to 60 percent of base pay to take into consideration health and safety factors. Other discretionary incentives would be added in an attempt to provide a more attractive total wage package in the wastewater sector.

3.52 In terms of training, severe deficiencies exist. Although NOPWASD is charged with the responsibility of providing national level training in water and wastewater trades, it is not currently performing this function to any significant degree. No national level training in the areas of management, financial planning and system design is provided. Although on-the-job training is provided in many of the water and wastewater organizations, this type of training is severely limited. It only meets the needs of the lowest skill levels. Higher skill training needs more formal classroom instruction and access to modern equipment. These are not generally available in all field situations. Some formal classroom instruction is available. The Department of Environmental Health, University of Alexandria, offers courses in sanitary engineering/chemistry and the Higher Institute of Public Health in Alexandria hold a training program in environmental health for sanitarians, engineers and chemists, as well as short courses for personnel specialized in water and sewerage treatment. Four Universities, Ein Shams, Cairo, Mansura and Asyut, offer post-graduate degrees in sanitary engineering and some offer training in management skills as well.

3.53 An overall study of training requirements in the entire water/wastewater sector should be initiated. Such a study could be patterned on the BVI/ATK work. The objectives of the study would be:

- (a) identify the professional, technical and operative skills that should be developed in both the water and wastewater sector, the level of competence and the appropriate wage levels that should be set;
- (b) quantify the numbers needed by organization and by geographical area;
- (c) propose how training/educational needs are to be met, the financial resources needed and the incentives that should be developed to secure the highest level of training possible;
- (d) develop a phased program for training and initiatives for retention of skilled personnel.

PART IV USAID STRATEGY

A. Lessons Learned

4.01 USAID recognizes that the water/wastewater sector is beset by a number of serious financial and organizational constraints. Our approach to sector constraints is based upon achieving interim targets during specific time periods. Although we realize that full fiscal autonomy within the sector will not be possible in terms of investment financing, we are interested in eventual full sector financing of both the operation and maintenance parts of the water organizations' budgets and eventually that of the wastewater organizations' budgets as well. In order to achieve this it is recognized that certain institutional organizational changes are needed.

4.02 One of the lessons we have learned from our over 5-year involvement in the sector is that covenants to loan agreements, particularly regarding tariff rate changes, tend to be disregarded or postponed and further amended over time. A review of our water/wastewater tariff covenants since 1977 indicate the following:

I Cairo Water Project

The original Loan Agreement (September 29, 1977) states:
". . . (2) tariffs should be set at a level high enough to produce an annual rate of return of six percent (6%) per annum on average net fixed assets . . ." This has since been modified in the First Amendment to Grant Agreement which requires "A financial plan based primarily on user charges . . . not later than October 1983."

II Alexandria

The original Loan Agreement (September 29, 1977) did not contain a covenant on rates. The Grant Agreement (August 29, 1979) states, "Upon completion of the Wastewater Management and Tariff Study, the Grantee shall submit a specific tariff plan for the Alexandria Water and Sewer System." (Note: To date no specific plan has been submitted however, water rates have been increased.)

III Cairo Sewerage

The Amendment to the Grant Agreement (September 27, 1981) added, "The Grantee agrees to develop a staged program for the introduction of tariffs or other mechanism that can be used to cover the costs of operation and maintenance and debt repayment." (Note: To date this has not been accomplished.)

IV Canal Cities

The Loan Agreement (September 30, 1978) states, ". . . no later than April 30, 1978, SCA tariffs shall be set at a level

high enough to produce a reasonable rate of return on average net fixed assets in operation." (Note: To date this has not been accomplished.)

4.03 We realize that changing tariff rates is a highly political issue and that there appears to be great reluctance to change rates without first demonstrating significant improvement in water/wastewater service. However, there have been some rate changes which have taken place over the past five years, particularly to commercial and industrial water consumers in the AWGA service area. Moreover it should be noted that the Cairo Executive Council headed by the Governor on April 3, 1983, approved raising water rates in order to conserve water use. (See Appendix G, pp G-13 and G-14 for a description of the new proposed rates and the probable impact of such rates on low income households.) On May 10, 1983, the Cairo Local Council approved a lower new tariff rate than that proposed by the Cairo Executive Council. It is anticipated that these new rates will go into effect on July 1, 1983. (See Appendix G, pp G-15 to G-17 for more details.)

4.04 USAID also is aware that higher tariff charges per se will not necessarily result in improvements to the system. Many difficult institutional issues remain. First there is the issue of collection of higher rates. Not only are not all service areas equipped with water meters but those that are must be working. Meters also have to be read, users billed, and fees collected. Public institutions, some of the heaviest users of water, have very poor payment histories. Moreover, without any local ability to retain tariffs, higher billings are not necessarily translated into higher system O&M.

4.05 From a national perspective, there previously has been very little attention to the sector. NOPWASD, which had been charged to give overall direction and support, has not been sufficiently funded and staffed to perform its duties. However, the present 5-year program 1983-87 is a positive sign. It confirms the magnitude of the present problem and the grave seriousness of future demands on the system that will inevitably come from continued higher rates of urbanization in Cairo, Alexandria, and, to a somewhat lesser degree, in the Canal Cities.

4.06 Given this series of events, USAID believes that the time is appropriate and the political climate conducive to develop a staged sector strategy. This approach will carefully take into consideration financial and institutional constraints, needs, and opportunities and will build upon targets of opportunity as they may present themselves. We plan to work with the GOE to develop a set of sector performance targets and a schedule of reform actions necessary for disbursement of funds.

B. Sector Strategy

4.07 AID will seek authorization for an additional \$1 billion in assistance for the water and wastewater sector. The additional funds would be programmed for obligation during the period FY 1983 through FY

1987 out of the current annual assistance levels. The \$1 billion would be in addition to the \$388.8 million already obligated for sector projects. This section outlines a recommended sector assistance strategy for USAID in terms of geographic distribution of investment, investment objectives, program structure, and steps to be taken to implement the program.

1. Geographic Distribution of Investment

4.08 USAID water and wastewater sector program will be focused primarily on the urban areas where AID already has been heavily involved. This strategy is based on three considerations.

- a. The GOE has asked AID to concentrate its capital investment in Greater Cairo, Alexandria, and the Canal cities.
- b. The concentration of population in these urban areas, both now and in the future, will mean that AID's limited capital investments will provide benefits to the maximum number of people.
- c. The existence of system master plans and on-going engineering design work in these urban areas will reduce the time required to design and construct individual project elements.

To the extent that secondary cities (such as Minia, Beni Suef, and Fayyum) develop water and wastewater investment projects not otherwise funded by AID or other donors, these also will be given consideration for funding within the water and wastewater sector program. The recommendations of the National Urban Policy Study will be used in determining the priority of investments in other secondary cities. That study recommended emphasis of investment in Qena/Naga Hamadi, Assuit, Aswan, Tanta, and Mansoura.

2. Investment Objectives

4.09 The USAID water and wastewater sector program will concentrate capital investments in technical areas that will provide immediate and visible improvements in service to consumers. Given the urgency of the need, it has been decided to concentrate the major portions of our investment in wastewater system improvements. Such investments would be designed to provide city-wide wastewater collection systems adequate to meet projected requirements for the year 2000. These investments would:

- a. reduce the incidence of wastewater flooding in sewered areas where wastewater sewer systems are overloaded or badly deteriorated, and
- b. extend wastewater collection systems into unsewered areas where existing water supply is creating flooding problems.

4.10 Our wastewater investment strategy calls for capital investments in improvement and extension of collection networks, rehabilitation and upgrading and new construction of sewage pumping stations and force mains, and rehabilitation of existing sewage treatment plants to provide effective primary treatment. AID's policy priority indicates that there will not be any investment in primary treatment plants at this time. The strategy also calls for improvement of solid waste collection efforts designed to prevent sewer blockage and improve overall environmental sanitation. Emphasis will be placed on improving solid waste management system and integrating new collection technologies with traditional approaches.

4.11 Funding for water systems would be limited to projects that will not further exacerbate wastewater problems. These investments would concentrate on commodity support to operations and maintenance organizations to help them reduce water leakage, and technical assistance in reducing the percentage of unaccounted-for water production. Attention also would be given to improving customer service.

4.12 Our water investment strategy calls for efforts to reduce water wastage and leakage, which contribute to flooding. In this regard, the single most effective measure to reduce wastage would be a substantial tariff increase. Capital investment in water systems can be left to other donors that have expressed interest in this subsector, as such investments are likely to be easier to divide into smaller projects. USAID funding would concentrate on commodity support for operations and maintenance programs and technical/management assistance to water organizations.

4.13 Technical/management assistance also would be provided to wastewater organizations to help them improve their operations and maintenance functions and generally upgrade their institutional capacity to manage the wastewater problems in each city. NOPWASD also would receive USAID funded technical/management assistance to strengthen its capacity: to establish sector policies at the national level; to coordinate sector funding for both capital investment and operations-maintenance expenditures; to provide engineering support to governorate level sector organizations; to provide other types of technical assistance to sector organizations; and to provide comprehensive manpower planning and training services for the sector.

4.14 The construction element of the sector program would be comprised of projects that can be completed quickly. Therefore, priority would be given to projects for which land has been acquired and on which construction can start within twelve months of the obligation of funds.

3. Program Structure

4.15 The Sector Assessment Study recommends that USAID's program for water and wastewater should be structured to allow maximum flexibility to

shift funds among various sector activities so that annual (new) obligations can be limited to actual sector needs for the immediate future. It would not tie up funds in projects that are not being implemented according to schedule. Rather, it would make it possible with the concurrence of the GOE to shift funds from slow moving projects to fast moving projects.

4.16 In order to achieve this flexibility, the Assessment suggests that all existing AID water and wastewater projects be merged through use of a sector Program Assistance Authorization Document (PAAD). The PAAD would establish a Water and Wastewater Sector Assistance Program. The money in the Sector Program would be allocated between three program activity categories:

1. Project Design and Supervision Services Fund,
2. Project Implementation and Commodity Support Fund,
3. Management/Technical Assistance and Training Fund.

4.17 Initially the money in each fund would be based on current USAID obligations and sub-obligations. For example, in the case of the Cairo Water Project, after being merged into the Sector Program the subobligation for ES-Parsons' design and supervision services would become part of the Project Design and Supervision Services Fund. The subobligation for the Howard-Harbert-Jones construction services plus all subobligations for commodity procurement would become part of the Project Implementation and Commodity Support Fund. The subobligation for the Black and Veatch tariff studies for GOGWS would become part of the Management/Technical Assistance and Training Fund.

4.18 Any new money obligated for the Sector Program not immediately subobligated under specific contracts would be available for allocation to any of the three funds with approval of a USAID-GOE Joint Sector Steering Group. Similarly, any new money allocated to a fund but not yet subobligated would be available to finance that fund's activities in any organization covered by the Sector Program. Thus, those GOE organizations that are able to move forward quickly with their projects would have access to all new unsubobligated money in the Sector Program.

4.19 Annual (new) obligations proposed for the Sector Program would be based on the anticipated level of subobligation required by each fund over the next twelve months and not on a predetermined annual obligation level. The proposed obligation would be the difference between projected subobligations of each fund and the unsubobligated allocation currently available in that fund. Actual obligation of new money to the Sector Program would be contingent upon the GOE's having satisfied specific conditions precedent (CPs) to obligations established at the outset of the previous year's funding cycle. These CPs would relate to specific steps to be taken in improving revenue generation and institutional development in the sector as outlined in this assessment.

4.20 The Assessment further recommends that the process of proposing new Sector Program obligations be undertaken by a USAID-GOE Joint Sector Steering Group operating at the level of the USAID Director and the relevant GOE Ministers. The GOE representation should include (but not be limited to) the Minister of Investment and International Cooperation, the Minister of Development, and the Governors with jurisdiction over cities included in the Sector Program. Their deliberations would take place in light of the recommendations contained in an annual Water and Wastewater Sector Review. The annual Sector Review would be the major product of a Joint Sector Executive Committee composed of representatives from USAID and the Ministry of Development. The Executive Committee would consult with all GOE organizations participating in the Sector Program. The Joint Sector Steering Group also would act upon the recommendations of the Joint Sector Executive Committee with regard to reallocation of money between the various Program Funds.

4.21 USAID believes that such a program structure would have several advantages over the current project funding mode. First, it would permit greater flexibility of financing for projects within the sector. Second, it would permit obligation of only those funds that would be needed for the sector in the coming twelve months. Third, it would permit a high level Joint Sector Steering Group to address sector issues in the context of agreed goals and annual AID sector obligations. Nevertheless, despite these apparent advantages, USAID also is concerned with the acceptance this approach would have with the GOE. We plan discussing with the GOE the issue of whether we should consider an umbrella approach similar to our activities in the Decentralization portfolio or conversely, whether we should continue our assistance in terms of discrete projects. Also, another consideration is the mode of contracting that we pursue. Discussions are presently underway with the U.S. Army Corps of Engineers (CE), for design build work for the West Bank Cairo Project. If the CE is used, USAID's staffing and internal organizational structure may need modifications accordingly.

4.22 It is proposed that current obligations for sector projects be maintained at their present levels. AID seeks \$1 billion of newly authorized funding in the sector for the 1983-87 period. However, it should be noted that these levels of authorizations will not be sufficient to meet the funding necessary for all proposed USAID water and wastewater projects in the sector over this time period. An indicative plan of needed obligations indicates that an additional \$408.2 million would be required. A total level of \$1.408 billion of future obligations would be needed according to the following general distribution: \$60 million for Project Design and Supervision, \$1.304 million for Project Implementation and Commodity Support, and \$44 million for Management/Technical Assistance and Training (see Figure 1).

4.23 It is not possible to indicate at this time the volume of obligations that will be required in each fiscal year between 1983 and 1987. This will depend on the immediate needs of the sector each year and the GOE's progress in satisfying various conditions precedent to obligation. These factors will be determined in the Annual Sector Review to be undertaken early in each fiscal year.

4.24 An indicative plan for USAID assistance to the water and wastewater sector has been provided by the Sector Assessment Study. This study indicates how USAID funding could be distributed among various uses in support of overall sector development. It is based upon the current portfolio of water and wastewater projects but recommends a major restructuring of the assistance program in light of its findings. Actual funding levels for various components of the program need not adhere exactly to those indicated. Rather, obligations would be based on the needs of the sector as the program is implemented.

4.25 The funding structure indicated in Figure 1 below is based on financing various specific elements in the overall development of the sector. The amounts indicated are based, for the most part, on very preliminary cost estimates. Actual funding requirements will vary as these estimates are refined.

4.26 Total planned obligation of \$690.0 million for the Alexandria wastewater system is expected to provide:

- \$15.0 million for completion of all "top Priority Projects" under the Alexandria Wastewater (I) project;
- \$60.0 million for engineering design and construction supervision of Phases 1 and 2 under the Alexandria Wastewater (II) Project;
- \$595.0 million for commodities and construction of Phases 1 and 2 under the Alexandria Wastewater (II) Project (both \$ and partial LE); and
- \$20.0 million for management advisory services and operations/maintenance training for A/GOSD.

4.27 Total planned obligation of \$ 771.1 million for the Cairo Wastewater system, is expected to provide:

- \$40.6 million for engineering design and construction supervision;
- \$718.5 million for pumpstation rehabilitation, sewer improvements in flooding areas, and construction of sewer networks on the west bank of the Nile (both \$ and LE); and
- \$12.0 million for management advisory services and operations/maintenance training for C/GOSD.

4.28 Total planned obligation of \$102.9 million for the Cairo Water system, is expected to provide:

- \$9.7 million for engineering design and construction supervision;
- \$89.2 million for completion of the Rod El Farag Water Treatment Plant expansion; and

Figure 1

INDICATIVE USIAD PROGRAM STRUCTURE FOR THE WATER AND WASTEWATER SECTOR
FY 1985 - 1987 (\$ MILLIONS)

ACTIVITY	DESIGN & SUPERVISION	PROGRAM FUNDS		TOTAL
		PEOPLE IMPLEMENT- ATION	MANAGEMENT & TRAINING	
<u>ALEXANDRIA WASTEWATER (I)</u>				
. CURRENT OBLIGATIONS	8.5	6.5	0.0	15.0
. FUTURE OBLIGATIONS	0.0	0.0	0.0	0.0
. SUB-TOTALS	8.5	6.5	0.0	15.0
<u>ALEXANDRIA WASTEWATER (II)</u>				
. CURRENT OBLIGATIONS	32.7	47.7	6.9	87.3
. FUTURE OBLIGATIONS	27.3	547.3	13.1	587.7
. SUB-TOTALS	60.0	595.0	20.0	675.0
<u>CAIRO WASTEWATER</u>				
. CURRENT OBLIGATIONS	18.6	76.5	4.0	99.1
. FUTURE OBLIGATIONS	22.0	642.0	8.0	672.0
. SUB-TOTAL	40.6	718.5	12.0	771.1
<u>CAIRO WATER</u>				
. CURRENT OBLIGATIONS	7.7	81.2	2.5	91.4
. FUTURE OBLIGATIONS	2.0	8.0	1.5	11.5
. SUB-TOTALS	9.7	89.2	4.0	102.9
<u>CANAL CITIES WATER & WASTEWATER</u>				
. CURRENT OBLIGATIONS	11.9	84.1	0.0	96.0
. FUTURE OBLIGATIONS	9.0	77.0	1.0	87.0
. SUB-TOTALS	20.9	161.1	1.0	183.0
<u>COMMODITY SUPPORT & MANAGEMENT ASSISTANCE</u>				
. SUB-TOTALS	-0-	30.0	20.0	50.0
<u>TOTAL PROGRAM</u>				
. CURRENT OBLIGATIONS	79.4	296.0	13.4	388.8
. FUTURE OBLIGATIONS	60.3	1304.3	43.6	1408.2
. SUB-TOTALS	139.7	1600.3	57.0	1797.0
. PERCENTAGES	(8%)	(89%)	(3%)	(100%)

- \$4.0 million for management advisory services and operations/maintenance training for GOGOWS.

4.29 Total planned obligation of \$183.0 million for the Canal Water and Wastewater systems, is expected to finance:

- \$20.9 million for engineering design and construction supervision;
- \$161.1 million for U.S. commodities to build three water and wastewater systems, as well as construction financing for the wastewater systems (both \$ and LE); and
- \$1.0 million for operator training in the three wastewater systems.

4.30 The total planned obligation of \$50.0 million for the Commodity Support and Management Assistance, is expected to provide:

- \$20.0 million for management advisory services to the Canal cities wastewater organizations, NOPWASD, and other GOE organizations that have a direct role in managing the water and wastewater sector such as the Ministries of Development, Finance, and Planning as well as the CACA; and
- \$30.0 million for commodity support to water systems in order to rehabilitate leaky pipelines and replace worn out equipment.

4 Program Implementation

4.31 In order for USAID and the GOE to implement the program outlined above, there are a number of steps that must be taken. Some of these steps should be undertaken immediately, others will take more time to complete.

a. Immediate Actions:

4.32 USAID endorses the Sector Assessment recommendation that a Joint Sector Steering Group should be formed composed of the Minister of Investment and International Cooperation; the Minister of Development; the Governors of Alexandria, Cairo, Giza, Ismailia, Port Said, Qalubiya, and Suez; the USAID Director and Associate Director for DRPS. USAID will request that the GOE consider developing this Steering Group whose responsibilities would be defined in a letter of understanding signed by its members. These responsibilities would include:

- Monitoring the development of the water and wastewater sector in terms of project implementation, financial viability, and institutional development;

- Agreeing on specific performance targets for sector revenue generation and institutional development for the coming fiscal year, and each subsequent fiscal year for the next five year;
- Proposing the level of new foreign assistance obligations to be allocated to the Water and Wastewater Sector Assistance Program after consideration of the annual Sector Review;
- Specifying the allocation of Sector Program monies.

4.33 In addition, USAID will request that the GOE consider converting the existing Joint Sector Working Group into a Joint Sector Executive Committee composed of the relevant Senior Under Secretaries of the Ministry of Development and USAID's Office Director for UAD, with ad hoc membership of the Chairmen of NOPWASD, A/GOSD, AWGA, C/GOSD, CWO, GOGOWS, and the Director of Engineering for SCA. The Committee's responsibilities would include:

- Identifying and resolving all problems delaying sector project implementation that are not being resolved by the respective sector organizations;
- Commissioning and approving an annual Sector Review to be forwarded to the Joint Sector Steering Group on the understanding that such Reviews will evaluate all aspects of sector performance as may be requested by any member of the Committee;
- Proposing changes in the allocation of monies in the Sector for approval by the Joint Sector Steering Group.

4.34 The Joint Sector Working Group composed of USAID and the GOE presently are examining various options to accelerate the implementation of sector projects through the use of turnkey contracting and other methods of reducing both AID and GOE interventions in the project implementation process. USAID urges that this review be completed within the next few months.

4.35 USAID also will request that the Working Group or restructured Executive Committee consider commissioning a manpower planning and training study for the water and wastewater sector. This comprehensive study should define the manpower needs of the sector until the year 2000 and propose relevant changes in employee compensation and training required to meet those needs.

b. Continuing Actions:

4.36 USAID proposes that a series of major reforms be undertaken in the sector. These reforms are:

1. increased budget support for the operation and maintenance of water and wastewater systems, especially for BAB 1 funding to support salaries (incentive/bonus pay-scales) that are consistent with skill needs and retention of skilled personnel in the sector, until such time as tariff revenues cover these costs (see recommendation Section III.E., Operations and Maintenance of Systems);
2. increased water tariffs such that water revenues cover the cost of operation and maintenance, routine annual improvements and existing debt service, for water systems; gradual introduction of wastewater tariffs as a surcharge on water tariffs to cover the cost of operation, maintenance, and routine annual improvements for wastewater systems (see recommendations Section III.B., Revenue Generation and Appendix G);
3. development of autonomous local water and wastewater organizations with the authority to plan, develop, operate, maintain, and finance their systems with the ability to retain the revenues they collect and apply the funds as needed to manage their systems; and the development of a national level policy making and coordinating body (see recommendations Section III.C., Organizational Constraints and Proposals).

4.37 In addition, USAID and the GOE will need to explore all means of reducing the time required to plan, design, and implement sector projects. All means of reducing both AID and GOE interventions in the project life-cycle should be examined and, where feasible, they will need to be adopted. In particular, the use of turnkey (design-build) contracting, as discussed above under immediate actions, needs to be exploited to the maximum extent possible. Moreover, USAID will explore with the GOE, advantages of converting its current portfolio of sector projects into a Water and Wastewater Sector Assistance Program beginning FY '84 through the development of an umbrella or a sector PAAD approach. This process would entail the definition of specific sector performance targets in the areas of revenue generation and institutional development to be used as conditions precedent to the obligation of new funds for the Sector Program.

4.38 USAID believes that the major reforms as outlined above are necessary to ensure the viability of the sector by the end of the current 5-year GOE plan. In terms of strategy, we believe that we must build upon GOE initiatives and find those targets of opportunity as may present themselves in the areas of budget support, tariff reforms and institutional restructuring. Most importantly, we see the formation of a Sector Steering Group and Executive Committee with wide representation, as recommended, as vital to engage the GOE in a policy dialogue on needed sector reforms. And it would be through this channel that we propose reform performance targets be set, around which we would obligate our new assistance levels on a yearly basis.

4.39 Based upon the manner in which USAID structures its sector investment program and the mode which it adopts for designing and building its projects, attention will be needed in restructuring its own organization. The Sector Assessment has made a number of specific recommendations in this regard including a reorganization and increase in staff for the Office of Urban Administration away from project specific lines to staffing under engineering and design, project implementation, and technical assistance and training. These recommendations need to be more carefully evaluated in terms of USAID's approach to sector investment and project implementation.

1985 CDSS ANNEX: EGYPT

WATER AND WASTEWATER SECTOR: STATUS, CONSTRAINTS AND STRATEGY

V	APPENDICES	
A.	Summary of IBRD's Water Supply and Waste Disposal Program in Tunisia	A-1
B.	Urban Growth Projections and Water/Wastewater Service Needs	B-1
C.	Environmental Health in Egypt	C-1
D.	Sector Organizations	D-1
E.	Public Sector Laws	E-1
F.	Sector Investment Plans	F-1
G.	Operations and Maintenance and Revenue Generation	G-1
H.	Report of the People's Assembly, Third Legislative Session	H-1
I.	Memorandum to the Higher Committee for Policies and Financial Affairs Regarding Water Rates	I-1

APPENDIX A

SUMMARY OF IBRD'S WATER SUPPLY AND WATER DISPOSAL PROGRAM IN TUNISIA

APPENDIX A

SUMMARY OF IBRD'S WATER SUPPLY AND WASTE DISPOSAL PROGRAM IN TUNISIA

The World Bank has been associated with water supply and waste disposal since 1969. Over the ten year period 1969-79, Bank and IDA credit lending wholly or partly affecting the water supply and waste disposal sector have amounted to U.S. \$234.0 million.

The Bank's involvement in the water supply and waste disposal sector in Tunisia represents an instructive example and has relevance to other LDC's facing similar problems of how a successful strategy can be developed despite serious shortages of physical resource and major organizational and institutional constraints in the sector. Initially the Bank faced the following sector problems:

- weak and fragmented organizations lacking ability to act autonomously
- lack of a coherent sector strategy and a strong governmental and institutional commitment towards sector development
- piecemeal sector planning and poor coordination among government institutions
- lack of attractive and rewarding personnel policies
- lack of efficient, equitable and financially sound tariff policies.

Importantly, the Bank was able to get the Tunisian Government to focus on the water and wastewater sector and to place it high in the scale of national priorities since it affected the scale of tourism development considered vital for national economic growth. Consequently, the Bank proceeded to develop a closer identification with the Government's own policy goals and a set of strategy objectives for the sector. Eventually the Bank was able to get agreement with the Government on a number of organizational, management and financial principles for the sector. The Preface to the IBRD Report No. 4146, Sector Operations Review: The Water Supply and Waste Disposal Program in Tunisia, October 20, 1982, provides a good summary of the Bank's involvement in the sector and is presented below in its entirety.

SECTOR OPERATIONS REVIEWTHE WATER SUPPLY AND WASTE DISPOSAL PROGRAM IN TUNISIAPREFACE

This report presents the findings of a study undertaken by the Operations Evaluation Department to assess the program of operations of the World Bank Group in the water supply and waste disposal sector in Tunisia up to the end of FY81.^{1/} It is the fourth in a series of such OED sector reviews although the first for water supply and waste disposal.

The World Bank's association with Tunisia's development extends over a period of nearly twenty years, beginning with the first IDA credit made in September, 1962. In total, from FY63 to the end of FY81, Tunisia received 47 loans and 11 credits, amounting respectively to US\$902.5 million and US\$74.6 million. Out of this total lending of US\$977.1 million, direct lending to the water supply and waste disposal sector amounted to US\$ 149.0 million, covering five water supply and two sewerage projects. In addition, a tourism project, the Sidi Salem Multi-purpose project and an urban development project contained water supply or waste disposal components. Total Bank and IDA lending to Tunisia by sector, for the period FY63-FY81, is shown in Table 1. Loans wholly or partly affecting the water supply and waste disposal sector are detailed in Table 2.

A number of considerations led to the selection of the water supply and waste disposal sector in Tunisia for OED's fourth country-specific sector operations review. Firstly, whereas direct lending to the water supply and waste disposal sector accounted for less than 5% of the Bank Group's total world-wide cumulative lending to the end of FY81, it was in excess of 15% of total lending to Tunisia. If indirect lending for water supply and waste disposal is also taken into account, the relative emphasis given to the sector in Tunisia is even more striking: direct plus indirect lending for water supply and waste disposal (i.e. including components of numerous projects in other sectors but principally rural and urban development projects) amounted to roughly 5.5% of total Bank Group lending to the end of FY81; for Tunisia, over the same period, direct lending plus the amounts for water supply and waste disposal in Table 2 related to the tourism operations (Credit 329-TUN and Loan 858-TUN), the Sidi Salem Multi-purpose project (Loan

^{1/} "Waste disposal" encompasses sewerage and sewage disposal as well as, storm water drainage, flood protection and solid waste disposal (i.e. household garbage). While several Bank projects have included drainage and flood prevention components, the only lending for solid waste disposal in Tunisia has been a component for Tunis City in the Second Urban Development Project, attracting about US\$3 million of Bank financing. Consequently, the study focusses largely on the sewerage/sewage disposal aspect of waste disposal.

Table 1Bank and IDA Lending Operations to Tunisia by Sector
(FY63-FY81)

	<u>FY63-67</u>		<u>FY68-72</u>		<u>FY73-77</u>		<u>FY78-81</u>		<u>FY63-81</u>		<u>%</u>
	<u>No.</u>	<u>US\$M</u>	<u>No.</u>	<u>US\$M</u>	<u>No.</u>	<u>US\$M</u>	<u>No.</u>	<u>US\$M</u>	<u>No.</u>	<u>US\$M</u>	
Agriculture and											
Rural Development	1	18.0	2	10.0	3	66.2	4	107.5	10	201.7	20.6
DFCs	1	5.0	3	30.0	2	34.0	2	65.0	8	134.0	13.7
Industry	-	-	-	-	1	23.3	1	18.6	2	41.9	4.3
Tourism	-	-	1	24.0	1	5.6	-	-	2	29.6	3.0
Transportation	1	7.0	5	57.8	1	28.0	3	111.0	10	203.8	20.9
Urbanization	-	-	-	-	1	18.0	1	19.0	2	37.0	3.8
Water Supply and											
Sewerage	-	-	2	25.5	3	72.0	2	51.5	7	149.0	15.3
Power	-	-	1	12.0	1	14.5	1	41.5	3	68.0	7.0
Other	<u>2</u>	<u>18.0</u>	<u>1</u>	<u>4.8</u>	<u>2</u>	<u>13.7</u>	<u>3</u>	<u>75.5</u>	<u>8</u>	<u>112.0</u>	<u>11.4</u>
Total	<u>5</u>	<u>48.0</u>	<u>15</u>	<u>164.1</u>	<u>15</u>	<u>275.3</u>	<u>17</u>	<u>489.6</u>	<u>52</u>	<u>977.0</u>	<u>100.0</u>

Table 2Bank and IDA Loans to Tunisia Wholly or Partly for
Water Supply and Waste Disposal

<u>FY of</u> <u>Approval</u>	<u>Loan or</u> <u>Credit No.</u>	<u>Project</u>	<u>Amount of Loan</u> <u>US\$ million</u>
1969	Ln. 581-TUN	First Water Supply/ <u>a</u>	15.0
1970	Cr. 209-TUN	Second Water Supply/ <u>a</u>	10.5
1972	Cr. 329-TUN)	Tourism Infrastructure/ <u>b</u>	24.0
1972	Ln. 858-TUN)		
1974	Ln. 989-TUN	Third Water Supply/ <u>c</u>	23.0
1975	Ln.1088-TUN	First Urban Sewerage	28.0
1977	Ln.1431-TUN	Sidi Salem Multi-Purpose	42.0
1977	Ln.1445-TUN	Fourth (N. Tunisia) Water Supply	21.0
1979	Ln.1675-TUN	Second Urban Sewerage	26.5
1979	Ln.1702-TUN	Fifth (National) Water Supply	25.0
1979	Ln.1705-TUN	Second Urban Development	<u>19.0</u>
			<u>234.0</u>

/a The Project Performance Audit Report for these projects (Report No. 1902) was distributed to the Board on February 13, 1978.

/b A Project Completion Report for this project was prepared in September, 1981.

/c The Project Performance Audit Report for this project (Report No. 3914) was distributed to the Board on May 4, 1982.

1431-TUN) and the loan for urban development (Loan 1705-TUN) exceeded 20%.^{1/} Secondly, Bank involvement in the water supply and waste disposal sector in Tunisia coincided with a period during which the Bank increasingly emphasized the goal of extending the benefits of water supply and waste disposal to a wider target group; Tunisia represents a particularly interesting and instructive example of how, despite a serious shortage of physical resources, a successful strategy to achieve that goal can be evolved, through a series of lending operations. Moreover, the essential ingredients which provided the foundation for the Bank's general strategy in Tunisia and which were crucial for its eventual success undoubtedly have relevance to other countries: a close identification with the Government's own policy objectives, coherent overall planning, the creation of sound institutions, and the explicit recognition of the strategy's technical, financial and economic implications. Thirdly, Tunisia was one of the first countries for which the Bank provided assistance to finance a national water system, rather than individual local systems. Finally, the compact size of both the country and the sector has facilitated the task of identifying the particular impact of Bank lending and - combined with the fact that a representative number of projects have already been audited - has helped to keep down the manpower resources needed for this survey.

The study focusses on the Bank Group's lending strategy in Tunisia and its relationship with the Government's own policy objectives. From the point of view of the Government, the scarcity of water resources in Tunisia gave the water supply problem an urgency which inevitably placed it high in the scale of national priorities; additionally, in combination with waste disposal, water supply was an integral part of the infrastructure required to take advantage of the growing importance of tourism to the national economy. In responding to these concerns, the Bank developed its strategy through a series of lending operations. Formal sector studies were never found necessary and the approach was not set out in detail in the Bank's Economic Reports and Country Program Papers. Instead, the appraisal reports from the beginning addressed the sector policy issues and project design, appraisal and implementation served as a vehicle for a productive dialogue between the Bank and the Tunisian authorities on all aspects of sector development. Certainly in retrospect, as the study shows, a coherent Bank strategy towards the water supply and waste disposal sector in Tunisia is apparent.

This report is based on a review of appraisal, supervision, audit and completion reports and of selected project files; on discussions with representatives of the Tunisian Government and sector agencies during a country visit to Tunisia in February, 1982 and on discussions with staff members of the Europe, Middle East and North Africa Regional Office. Assistance received during the country visit from Government and the sector agencies is gratefully acknowledged.

Following normal OED procedures, a draft copy of this report was sent to the Government, Societe Nationale d'Exploitation et de Distribution des Eaux (SONEDE) and Office National de l'Assainissement (ONAS) for comments. The comments which were received have been taken into account in finalizing the report and are also reproduced as Appendices to the report.

^{1/} In the case of the Sidi Salem Multi-purpose project, separation of the water supply component is particularly difficult. The figure of 20% includes a very conservative estimate of the amount attributable to this component.

SECTOR OPERATIONS REVIEW

THE WATER SUPPLY AND WASTE DISPOSAL PROGRAM IN TUNISIA

SUMMARY, CONCLUSIONS AND MAIN LESSONS

Sector Background, Constraints and Policy Issues

1. Water is a scarce commodity in Tunisia. The main sources of fresh water are found in the mountains, over 100 km distant from the coast, where the main concentrations of population are situated; although groundwater exists near those centers, much of it is too saline even for irrigation use and has to be mixed with fresh water to be suitable for human consumption. However, the rivers bringing fresh water from the mountains have irregular flow regimes, as well as themselves becoming saline as they approach the coast. In consequence, there is a need for storage dams, long transmission lines and sophisticated treatment to supply the coastal conurbations, in particular Greater Tunis and Sfax, where one-third of the urban population lives. This entails high unit costs, which are increasing as the more marginal sources are tapped and as service is extended to the more scattered communities. For much of the country, moreover, known resources will be exhausted within 20 years, leaving desalination or recycling of waste water as possible alternatives. These constraints dictate the most careful planning for the optimum development of all water resources, as well as realistic pricing policies and efficient operating practices, to ensure prudent utilization of this scarce commodity, while still meeting social needs (paras. 1.01-1.03).

2. After independence, in 1956, the Government devoted considerable attention to the provision of piped water supplies and by 1967, when the Bank first became involved, piped water had become available to about 45% of the population. However, service was still mainly by public taps, with few private connections outside Tunis and Sfax, and the available supply capacity was insufficient to meet peak demand; in order to supply the tourist areas, on which Tunisia increasingly relied for foreign exchange, some residential and commercial consumers had to submit to use restrictions. Low pressures permitted dangerous pollutants to filter into the mains. Waste disposal lagged much further behind. As late as 1974, only twenty municipal sewer systems existed; even these were overloaded and in poor condition, for lack of money and trained staff. Receiving waters became polluted with raw sewage; when it rained, sewage flooded the streets; and in the dry season, stagnant sewage caused pipe corrosion and offensive odors (paras. 1.04 and 1.06).

3. Institutionally, the sector was weak and fragmented, with responsibilities distributed among several bodies. The principal agency in the water supply subsector was Regie des Eaux (RDE), a division of the Ministry of Agriculture; RDE was however understaffed, with inadequate revenues, and no

real autonomy, so that effective and comprehensive forward planning to meet the country's water supply needs was not possible. The waste disposal subsector was even less effectively organized, with half a dozen national agencies intervening, besides the municipalities, which were the nominal sewerage authorities. Here too, the absence of a clear concentration of responsibility meant that planning could only be piecemeal, with no guarantee of effective implementation by the impecunious municipal councils (paras. 1.05 and 1.07).

4. If these limitations were to be overcome, a coherent and realistic strategy was required. The essentials of such a strategy, based upon the Bank's own experience in the sector, were recently summarized in the following set of principles^{1/}: commitment by the Government and the sector agencies to the strategy; cooperation between the Government and these agencies; innovative and appropriate technology; stable and autonomous institutions, able to adjust to meet growing responsibilities, with personnel policies which ensure retention of trained staff in sufficient numbers; tariff policies which promote efficiency, equity and sound finances; and dynamic attitudes toward the needs of those hitherto inadequately provided with water and sanitary services (para. 1.08).

5. Policies consistent with these criteria have been progressively introduced and implemented by the Government during the last fifteen years, in close and continuous cooperation with the Bank. This cooperation began in 1967, after the Government had requested financial aid for a modest program of investments; the program was however insufficiently detailed or coherent, and the Bank drew attention to this deficiency as well as to the unsatisfactory financial and institutional state of the sector. Accordingly, the Government commissioned studies to recommend remedies. The result was a National Water Program for the period 1968-73, giving first priority to improving supply in areas of high population density and in tourist areas, together with the introduction of a realistic tariff and the creation of an autonomous national water company, Societe Nationale d'Exploitation et de Distribution des Eaux (SONEDE). Some seven years later, similar action was taken to reorganize the sewerage and sewage disposal subsector, by the creation of Office National de l'Assainissement (ONAS), a parallel national agency, and with the objective of eliminating the imbalance between water supply and waste water treatment capacity by the mid-1980's (paras. 1.09-1.13).

6. Successive National Development Plans reflect the evolution of the Government's policy and the growing importance which it attached to the sector. From a modest allocation of D 16 million for water supply and D 9 million for sewerage in the Third Plan (1969-72), the provision has risen to

^{1/} "Water Supply and Waste Disposal" (Poverty and Basic Needs Series, September 1980).

D 173 million (water) and D 73 million (sewerage) in the Fifth Plan (1977-81) For the Sixth Plan, now commencing, the amounts provided are likely to rise still further to D 275 million and D 120 million respectively. Although the value of these allocations in real terms is masked by inflation, a steady and cumulative investment is visible and the percentage of total fixed capital formation devoted to water supply and sewerage has increased significantly since the Third Plan (para. 1.14).

7. While the earliest priority was to overcome deficiencies in existing water production, water distribution and sewage treatment facilities, subsequent investment programs were increasingly directed towards extending services into new areas, particularly low-income districts. Easy credit was made available for house connections and piped water was provided from public taps to the more important rural villages, which because of their small size and scattered nature had previously received little attention. Plan targets from 1973 onwards, for water supply, have been predominantly in terms of percentages of population served; by 1981, the aim was to supply 43% by private connections, with 64% in all being served by the system (compared with only 17% and 45% respectively, in 1967). The respective percentages actually achieved were 42% and 62%.^{1/} For sewerage and sewage disposal, Plan objectives have merely comprised the execution of investment programs to catch up the backlog, but for the draft 1982-86 Plan, a tentative target of 60% connections in the municipalities has been proposed (paras. 1.15-1.18).

8. Investment policies have been based on a program of appropriate studies of overall water resources, to ensure rational allocation as between potable water (which has first priority) and other uses, notably irrigation. Water Master Plans have been drawn up for the country's three physical regions; these determine the optimal utilization of resources, using complex systems of dams, hydroelectric works, interconnection canals and drainage channels, to improve agricultural production, minimize flooding and supply potable water needs. To finance all these investments, the Government has identified a wide range of external financing sources, as well as itself contributing substantial sums to the sector (paras. 1.19-1.21).

Bank Lending

9. During the fifteen years for which the Bank has been active in the Tunisian water supply and sewerage sector, it is fair to say that, in varying degrees, each forward step in the sector has been planned and executed according to the Government's priorities, with the Bank's support and advice. There appears to have been a considerable unanimity of views between the Bank, the Government and the sector agencies on what needed to be done at each

^{1/} These figures are only indicative, because population figures, both in total and numbers served, can only be estimated approximately.

stage, resulting in a continuing and productive dialogue. In the course of a series of projects involving the same institutions, the Bank's approach to sector issues has thus developed naturally in step with the development of the sector itself and with changing emphasis in the Bank's own perceptions. While earlier projects were clearly justified by the sector's manifest deficiencies, without explicit analysis of other issues, a more coherent strategy and an increasing attention to social and environmental aspects have gradually emerged. Bank operations in the sector have at all times reflected a concern for sound institution-building and for timely and well-coordinated project preparation, with emphasis on technical assistance (paras. 2.01-2.02).

10. To date, roughly half the Bank Group's lending to Tunisia has been in the field of infrastructure and urban development (para. 2.03). The amount lent so far for water supply and waste disposal, or for projects with components affecting that sector, is US\$234 million, involving nine loans and two credits. There have been five water supply projects, two sewerage projects, an urban development and a tourism project each containing water supply and waste disposal components, and a multi-purpose project for developing water resources in Northern Tunisia, in accordance with the regional Master Plan (para. 2.04).

11. The first two water supply projects covered most of the program of urgent works comprising the National Water Program 1968-73; the third concentrated mainly on works to supply Sfax, where demand had outstripped water resources as early as 1964. The fourth project comprised works to improve production and distribution systems in Northern Tunisia and thus to increase the percentage of population with private connections; while the fifth project was a sector loan financing a nationwide program of extensions, including service to rural villages not previously served. Both sewerage projects covered urgently needed rehabilitation of sewerage and sewage disposal facilities, mainly in the Greater Tunis and Sfax areas (paras. 2.05-2.12).

12. The Bank's appraisal of these projects appears to have been appropriate and competent, although there was some over-estimation of the growth of water sales (paras. 2.13-2.14). Partly for this reason, the incremental financial rates of return as recalculated for the projects so far completed appear to be below those estimated at appraisal, although still acceptable in view of the quasi-social nature of the service (paras. 2.15-2.18).

13. In general, the projects have been, or are being, competently executed, in accordance with the original concept. An exception was the Third Water Supply Project, where the aquifer capacity to supply Sfax proved greater than supposed and capable of supporting larger production and transmission facilities; the increase in cost of this component reduced the Bank funds available for financing supply to small centers. Another exception was the Tourism Infrastructure Project, where detailed land use plans proved to be significantly different from the general plans used for appraisal. In the

former case, the audit report concluded that appraisal had been premature. In the latter case, not yet audited, the PCR reached a similar conclusion (paras. 2.19-2.20).

14. On the question of time overruns, projects in both the water supply and sewerage subsectors suffered substantial delays (3-4 years) in the early years, when the sector agencies (SONEDE and ONAS) were still inexperienced, but the slippage has diminished under subsequent projects as the institutions became stronger. Part of the problem, for both time and cost overruns, hinged on the inadequacy of the Tunisian contracting industry, and the Bank financed a special study to investigate this. The delays in starting up projects when prices were rising also contributed to cost overruns; the worst cost overrun to date has been 60% for the Third Water Supply Project, but this was partly attributable to the increased scope of the project, mentioned in para. 13; the Tourism Infrastructure Project's water and sewerage components also suffered high cost overruns because of a four-year delay in project completion. (paras. 2.21-2.27)

15. From the outset, the most useful aspect of the Bank's contribution may have been the identification of key areas where deficiencies existed, perhaps imperfectly perceived up to then by the national authorities. The Bank identified four key objectives or priority areas for attention (apart from purely technical goals): resource mobilization, institution building, sound sector finances, and the recognition of the sector's social dimension (para. 2.28).

16. Tunisia's financing needs for the sector exceed the limited resources which the Bank can offer and therefore an important objective has been to assist the Government in mobilizing other external resources; several lenders have relied on Bank appraisal reports, so that Bank staff inputs have had a catalytic effect on project financing (see para. 26). The Bank has also emphasized the importance of coordination between national agencies (which tend otherwise to deal with each other at arm's length) and has several times insisted on formal cooperation agreements between the sector institutions and other municipal or public utility bodies (paras. 2.29-2.30).

17. The establishment of effective institutions, with financial and managerial autonomy, has always been a key objective of Bank project work and the creation of such institutions in a viable form was considered to be a prerequisite of the first loan in both the water supply and the sewerage subsectors. Particularly in SONED's case, long negotiations took place to ensure its managerial independence. In both subsectors, the Bank has continuously monitored staffing needs and urged action to remedy deficiencies. In the sewerage subsector especially, the shortage of technical staff led the Bank to impose loan conditions requiring an effective training program to be instituted (paras. 2.31-2.32).

18. Financial objectives of the Bank in the water supply sector were initially limited to securing the beneficiary's viability, with standard covenants concerning rates of return on assets, debt limitation and prompt

payment of water charges by public agencies. Later however, increased attention was paid to the tariff structure - particularly with regard to the high cost of meeting peak demand in tourist establishments and the need to meet the basic water supply requirements of low income consumers at an affordable price. The rate of return covenant requires revaluation of assets, which has been resisted in Tunisia, and for ONAS a cash generation covenant has been agreed (although this too implies revaluation). In the sewerage subsector, the Government provides operating subsidies to ONAS on the grounds that benefits from its activities accrue to all residents, not merely to those with sewer connections; however, the Bank has consistently urged that sewerage tariffs move towards full cost recovery (paras. 2.33-2.35).

19. With regard to the sector's social dimension, it is possible to think about extending service to the lower income groups, often living in shanty-town areas, and to those in the remoter urban communities and rural agglomerations once the backlog of service to existing consumers has been overcome. The Bank shares the concern of the Tunisian authorities to reach these population groups through additional physical investment, concessionary tariffs and easy credit for connection costs. However, social and economic objectives may not always be compatible, and the high cost of serving the more scattered communities may rule out early provision of service, since even in Bank-financed programs, per-capita cost is an important consideration in the selection of subprojects (paras. 2.36-2.38).

Assessment of Achievements

20. As might be expected, the Bank's major effort in the water supply subsector came with the First Water Supply Project, in particular in the establishment of a sound institutional and financial framework, which required long preparation and negotiation. Thereafter, project identification and preparation flowed relatively smoothly as a product of the continuous dialogue between the parties. The sewerage subsector also took time to be organized before it could obtain a major Bank loan; the initial involvement materialized as part of the complex Tourism Project. The delays in that project, combined with the somewhat lower priority accorded to sewerage compared with water supply, postponed the preparation of a major waste disposal project for some years (para. 3.01).

21. The Bank's appraisal of the various projects was carried out with a reasonable degree of staff continuity. Subsequent supervision was conducted regularly and efficiently (paras. 3.02-3.03).

22. The Bank's perceptions of sector priorities in Tunisia, as inferred from a retrospective examination of the lending program, appear to have coincided closely with the Government's own views. Whether these were well-judged can be assessed with hindsight in the light of actual achievements. The priorities comprised, in order: sound institutions and sector finances; a coherent works program, with the most pressing deficiencies remedied first; a long-term water resources plan; and the extension of service into poorer

areas. In the sewerage subsector, they included: rehabilitation of existing systems; a phased timetable for takeover of other systems; and a program of construction and expansion. The Bank also focussed on specific problems likely to arise and urged measures to meet them, including studies of: ways to supplement conventional water supplies, for example by recycling of effluent and by desalination; ways of reducing the overload on the construction industry; staffing inadequacies; and the high cost of water supply to tourism areas. This alertness towards possible problem areas may have been one of the most helpful facets of the Bank's assistance (paras. 3.04-3.05).

23. Many of the Bank concerns were embodied in appropriate loan covenants, which seem to have incurred little controversy and to have been accepted as useful and necessary. By and large, compliance with these covenants has been satisfactory, although in the case of the rate of return covenant for SONEDE, tariffs successively in force appear to be calculated on medium-term cash flow needs, rather than derived from the criteria specified in the covenant (paras. 3.06-3.07).

24. The physical development of the water supply subsector since Bank involvement has closely followed the priorities outlined in para. 22. The first task was to improve and expand the inadequate water supply systems of the most heavily populated and economically important regions of Tunisia and the vital tourist areas. As the 1970's progressed, works were put in hand to meet demand in the main centers up to 1981; water resources were catalogued and allocated; the ambitious plan to harness and distribute the resources of Northern Tunisia was implemented; and by 1979 production facilities had been expanded to the point where it was possible to begin extending networks into the lower-income areas and the larger rural villages. SONEDE's annual capital investments have risen from a modest D 3 million in 1970 to D 53 million in 1981. In all, SONEDE has invested D 235 million, of which more than 40% has been financed from its own revenues, including consumer contributions (paras. 3.08-3.10).

25. In the sewerage subsector, ONAS has rehabilitated and expanded treatment plants in Tunis, so that after centuries Lake Tunis is becoming free from pollution. Sewers in other systems are being renewed and extended as they are progressively taken over. A national program of works, in order of priority, has been established, covering some 60 towns, in addition to the ongoing projects. Total expenditure over the period 1976-81 was D 93 million (compared with only D 9 million 1962-71). ONAS had planned to provide service by 1981 to all inhabitants having water connections, but this target has proved too optimistic. The task of taking over existing systems, providing funds to rehabilitate them, and then providing staff to operate them efficiently is requiring longer than expected, and ONAS's service targets are now flexible (para. 3.11).

26. As mentioned in para. 16, the limited availability of Bank funding in comparison with the considerable resources required for the development of the water supply and waste disposal sector led the Bank to make considerable efforts to organize co-financing. These efforts were successful and

resulted in a particularly close collaboration between the Bank and SIDA. In addition, there have been foreign contributions to the sector's investment program outside the Bank-financed projects (para. 3.12)

27. Institutionally, the sector has developed in a most satisfactory manner. With the aid of management consultants and advisers, SONEDE resolved its initial problems and has become a mature and efficient institution, with a contented and dedicated staff. It has now dispensed with consultants and carries out its own appraisal of subprojects for Bank financing, besides providing technical assistance to other developing countries. Having in addition a history of sound finances, it is clear that SONEDE represents something of a success story. ONAS is following the same path, although still relying on consulting assistance; the Bank's prompt intervention helped to overcome staffing and management problems in its early years, and it too now promises to become an effective public utility unit. Both authorities have comprehensive training programs (paras. 3.13-3.18).

28. Technical operations in the sector appear to be efficient. Water pressures and quality are satisfactory and SONEDE has successfully developed its program of connecting new consumers, from about 11,000 a year initially, to between 30,000 and 40,000 annually in recent years. This program has helped counterbalance a declining trend in per-capita consumption which is attributable to a number of causes, including extension of service to low-income areas and price elasticity of demand in face of the sharply progressive tariff. As a result, it was possible to quadruple the number of customers in twelve years with only a doubling of production capacity. One problem which SONEDE has been unable to overcome is that of unaccounted-for water (the difference between water produced and water sold), which continues to hover around an unsatisfactory 30% of production. According to SONEDE, the problem is caused by difficulties in the accurate metering of supplies and by the influence of very long supply lines on network efficiency. A continuous campaign is waged to reduce losses, and the Bank is financing the purchase of large quantities of new meters. In sewerage, regular preventive maintenance is now in operation, a steady program of new connections is under way, and effluent quality is monitored routinely (paras. 3.19-3.25).

29. Sector finances are also satisfactory. Prior to the Bank's involvement, water tariffs were inadequate and only reflected the concept of a social service. As a condition of the First Water Supply Project, the average rate was almost doubled and charges have been regularly revised on the basis of tariff studies carried out by SONEDE; further increases are programmed to the horizon of 1986, to cover needs to the end of the next National Plan period. However, the "lifeline" rate for small consumers has remained unchanged since 1968, compensated by progressive increases in the rates for higher consumption. Until recently, the tariff reflected the average medium-term marginal cost of water, but with the gradual harnessing of all sources usable at reasonable cost, the marginal cost of future supplies has escalated

beyond the reach of an acceptable tariff. Nevertheless, the tariff represents a commendable attempt to combine financial viability, economy, efficiency and social considerations (paras. 3.26-3.32).

30. For sewerage the Government believes that the benefits to the environment, including the enhancement of the value of state-owned land, justify charging only part of the cost of the service to connected customers, the remainder (about 70%) being met from national and local taxes. However, since the cost of sewerage facilities is a function of water consumption, there should be a greater direct contribution by customers and, in fact, tariff proposals now under consideration aim at eliminating Government subsidies within five years (paras. 3.33-3.35).^{1/}

31. Tunisia's strategy for extending the benefits of water supply and waste disposal services to a greater number of people has been profoundly affected by the heavy concentration of its population in urban areas. Thus, the emphasis was placed initially on making good deficiencies in the existing service for major cities; subsequently, the emphasis shifted towards expanding the networks into previously unserved urban areas and the larger villages. Financial encouragement to lower-income consumers was provided in the form of credit for water supply and sewerage connection costs and through the graduated water supply tariffs. As a result, the lowest-income groups spend only a modest proportion of their income on water supply and to date no sewerage rate has been levied on dwellings which consume less than 40 m³ of water per quarter. Bank projects have supported and promoted this strategy and were entirely consistent with the Government's own objectives (paras. 3.36-3.40).

32. The strategy's impact on the health, well-being and productivity of the population cannot, unfortunately, be measured; neither is it possible to measure the extent to which the strategy has succeeded in reaching identified target groups in the absence of a properly designed and detailed national household survey. Nevertheless, although health statistics show no noteworthy trend, it can be stated that the percentage of the population served by SONEDE has increased by more than one-third since 1967 (from 45% to 62%); many thousands of additional people now have access to water services; and the inference is that these people are numbered increasingly among the target groups, since the better-off will tend to have been among the earliest beneficiaries. Indeed, practically the whole urban population now has some form of access to potable water. Achievements in the sewerage subsector, although commendable, have been more modest and there is still a large gap between the numbers of urban water and sewer connections (paras. 3.41-3.44).

^{1/} One of these proposals was, in fact, implemented in February 1982.

33. Looking ahead to the rest of the 1980s the Government has responded to U.N. proposals for the International Drinking Water Supply and Sanitation Decade 1981-1990 by setting out a number of cautious and qualitative objectives. Despite the constraints on the availability of financial resources, which are difficult to forecast, it seems reasonable to anticipate that all urban centers and major rural villages will be satisfactorily served by 1990 although the prospects for other rural inhabitants are less favorable (paras. 3.45-3.47).

34. The Tunisian authorities accept that the rural part of the sector has been neglected. SONEDE is not responsible for communities with under 500 population, yet about one-third of the population lives in such communities and relies on shallow wells and irrigation channels for their water. Bank activity in this part of the sector has been practically non-existent (paras. 3.48-3.49).

35. The demand for adequate water supplies on the part of the rural inhabitants has recently increased and ambitious investment programs have been drawn up. Some foreign aid has materialized, notably from the Federal Republic of Germany but lack of funds is a severe handicap; equally, the absence of a proper institutional structure for rural water supply is a bar to progress and the Tunisian authorities urgently need help on both counts. Some Tunisian officials appear reluctant to approach the Bank for assistance because they regard Bank funds as entailing a requirement to earn financial returns. Nevertheless they believe that the Bank could offer help and advice on the basis of its wider experience of institutional problems, as it did with SONEDE and ONAS (paras. 3.50-3.53).

36. Waste disposal also includes household garbage disposal, where the Bank has financed a small component in an urban development project. However, in general, this subsector appears to be given little priority in Tunisia and the scope for further Bank involvement seems minimal (para. 3.54).

Conclusions

37. Taking the principles summarized in para. 4 as the appropriate criteria for a successful sector strategy, it is apparent that these have been applied energetically and to considerable extent satisfied in the water supply and waste disposal sector in Tunisia. The overall sector strategy has been well defined in national plans and investment programs; the Government and sector agencies have committed themselves to the successful implementation of that strategy; close cooperation exists between the Government and these agencies; new solutions in technology have been tested; efficient and independent institutions have been established, with capable staffs; tariffs (for water supply at least) have been carefully structured to cover operating and a fair proportion of capital costs with the burden on customers graduated as far as possible on ability to pay; and services have been provided to thousands of additional people, including increasingly the poorest segments of society (para. 4.01).

38. The Bank's financial contribution to the sector has been small relative to the sector's global requirements, although it has been able to achieve a multiplier effect in stimulating participation by other financing agencies (paras. 1.21, 2.29 and 3.12). In terms of intangibles, the contribution has been greater. The Bank helped to lay the foundations for a successful sector by: insisting on sound institutions and sound finances, concepts which found ready acceptance in Tunisia; using its accumulated experience to foresee technical problems and endeavoring to address them ahead of time; and its emphasis on sound project preparation, tailored to implementation capacity. The Bank's preparation of the Third Water Supply and Tourism Infrastructure Projects, however, is open to criticism and the appraisals may have been premature (paras. 4.02-4.04).

39. In most respects, achievements in the sector have been commendable but they apply almost entirely to projects for the benefit of those who live in urban localities and the larger rural settlements. The scattered rural inhabitants - one third of all Tunisians - have been left further and further behind, although their needs in water supply and sanitary services are no less urgent. The Bank's comparative inactivity in rural areas may be explained in a number of ways: the lack of specific requests from Tunisia reflecting Government's priority; the high cost of providing services to the dispersed rural population; limited resources and Tunisia's large investment requirements in general; the lack of revenue resources of the inhabitants concerned; the absence of a sound institutional structure; the presence of other external agencies in the field; and possibly diffused divisional responsibilities in the Bank itself. Whatever the reasons, there is clearly a growing imbalance in the level of services provided in Tunisia, an imbalance which can and should be addressed if the country is to make progress towards achieving the UN goals for the Water Supply and Sanitation Decade: "pure water and adequate sanitary services for all" (paras. 4.05-4.06).

Main Lessons

40. Although the principal lessons of the study follow more or less obviously from the conclusions, this should not cause them to be overlooked or underrated in their implications for other operations programs in this sector. As stated in the Preface, "the essential ingredients which provided the foundation for the Bank's general strategy in Tunisia and which were crucial for its eventual success undoubtedly have relevance to other countries." Lessons can and should be learned from successful case histories and experiences as well as from the less successful ones; the fact that there have been few examples of the Bank's involvement in the water supply and waste disposal sector as successful as the Tunisian experience demonstrates that the ingredients of success are not always present.

41. The essential ingredients which lay behind the Tunisian success should be disseminated widely to ensure their presence, as far as possible, in similar future lending operations. They are:

- (a) the Government's policy objectives should be detailed and coherent; the appropriate institutions to implement these objectives should be in place or about to be put into place in a timely manner; and the technical, financial and economic implications of the policy objectives should be explicitly recognised;
- (b) the commitment of the Government to these policy objectives should be expected to continue with a high degree of probability in the longer term; the degree of probability should be measured against the strength of objective forces, such as the extent of scarcity of water resources and the importance of the development of the sector for the development of the economy; and
- (c) the Bank's program should be in harmony with the Government's sector policy objectives and loan covenants be accepted by the Government as necessary and achievable.^{1/}

42. Where the essential ingredients for success exist, as elaborated in this study, the Bank should be prepared to devote manpower to the sector, even though the Bank's own financial contribution may be limited, given the constraints on the Bank's overall lending program, since the financial leverage exerted through other lending agencies and the non-financial contributions brought by Bank staff can have a powerful catalytic effect (paras. 3.12 and 4.03).

43. Although sector studies normally precede Bank lending, a full-scale formal sector survey need not be an essential pre-condition for the water supply and sewerage sector in every country. A sector strategy can be developed successfully, through a logical series of lending operations, in cooperation with the Government (para. 2.01).

44. However, if it is appropriate in a particular country to proceed without full-scale formal sector studies, the Economic Reports should give special attention to the main lines of a coherent sector strategy. While recognising the macroeconomic emphasis of the Bank's country economic reporting system, a brief but coherent statement of medium and longer-term sector strategy in the Economic Reports would provide an efficient alternative to full-scale formal sector studies, a convenient focus for a discussion of time-based priorities (e.g. between regions and between urban or rural areas) and some guarantee that the absence of effort in a specific subsector or the low priority attached to it (e.g. solid waste disposal or scattered rural settlements) is the result of deliberate choice and not neglect or oversight.

^{1/} Experience with the rate covenant in Tunisia suggests that the greater the degree of agreement on underlying policy objectives, the less the need for written covenants. The comparative lack of friction over tariffs - which regularly create conflict between the Bank and the Governments in other borrowing countries - appears to have stemmed more from the Government's commitment to its own policy objectives and to the recognition of the financial implications of those objectives than from the existence of the rate covenant (para. 3.07).

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1985 CDSS ANNEX : EGYPT, WATER AND
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1 OF 1 (24X)
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COUNTRY DEVELOPMENT STRATEGY STATEMENT